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DUBLIN
EXAMINATION PAPERS:

OR
A Supplement

TO THE
UNIVERSITY CALENDAR
FOR THE YEAR

1866.



DUBLIN

Printed by the University Press.

HADDON, SMITH, AND CO., GRAYSON STREET,

Stationers, and to the University.

LONDON: THOMAS STOKES, AND CO.

1866.





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BY M. H. GILL.

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DUBLIN EXAMINATION PAPERS,

1865.

UNDERGRADUATE HONOR EXAMINATION PAPERS.

Hilary Term.

SENIOR SOPHISTERS.

Ethics.

DR. MALET.

1. When the ancient philosophers said that Vice was contrary to Nature, in what sense must they have used the word "Nature"? Give Butler's remarks in full.

2. When we say that the world is kept in the tolerable order in which it is by Human Nature, in what partial sense is the word used? Why is it partial?

3. Lord Shaftesbury, from his own statement, ought to have been guarded against the deficiency in his system?

4. What moral obligation does Butler mention as having been disputed? Show it to be an obligation; and yet, in a peculiar sense, a precept of Christianity.

5. What does Butler remark about the influence of Self-love in the world? What common error does he remark about this? and by what instance does he show this error?

6. What remarks does he make about the Epicurean System, as distinct from the religious or moral institution of life, and the results which would follow from it?

7. What practical rule of our Saviour does he recommend as a guard against Self-deceit? and what are his remarks on this rule?

8. In what precept of our Saviour is the principle of Virtue included? and how does Butler show the peculiar propriety of this?

9. The precept, "Love thy neighbour as thyself," may be considered in three views. Sketch briefly Butler's remarks on them; and in third sense what fancied dangers does he notice and remove?

10. State his remarks on this precept, as containing under it all virtues; and in what peculiar way is it to be treated as a maxim of conduct?

MR. ABBOTT.

1. State and develop the Stoical comparison of life to a game.
2. Discuss briefly the utility of Casuistry.
3. Give a summary of the arguments by which Hutcheson supports his theory of the nature of Virtue.
4. Show in what respect these arguments are fallacious, and state the positive arguments of Butler in opposition to such theories.
5. Analyze the notions of good and ill desert.

DR. WEBB.

1. State the evidences for a Future State, arising from the Human Constitution, and from the circumstances in which man is placed.
2. Give an outline of the Evidences for the Moral Government of the World.
3. There are certain principles which co-operate with our Moral Powers in their influence on the Conduct; state their mode of action.
4. *πᾶσα ἀρετή, οὗ ἀν' ἧ ἀρετῇ αὐτὸ τὸ εὖ ἔχον ἀποτελεῖ, καὶ τὸ ἔργον αὐτοῦ εὖ ἀποδίδωσι.* Explain this passage, and show its connexion with the moral development of man.
5. *Εἰσὶ δὲ καὶ ἐν τοῖς πάθεσι καὶ ἐν τοῖς περὶ τὰ πάθη μεσότητες;* There are two remarkable instances of this? Explain the passage with reference to these.

Experimental and Natural Science.

PHYSICS.

MR. GALBRAITH.

1. Calculate the weight of 1075 litres of coal gas (sp. gr. = 0.48), at the temperature 14° C., and pressure 775^{mm}.
2. What is the relation between the absolute weight of a body and its weight in air?
3. Apply this relation to find the absolute weight of a gallon of water (sp. gr. of brass = 7.824).

4. Show how the weight of mercury expelled from the weight thermometer is a measure of the temperature.
5. By what equation is the specific heat of a substance determined from the weight of ice it melts in the calorimeter?
6. Explain the manner in which dew falls, and the circumstances favourable to its deposition.
7. If a Leyden jar be discharged on an insulating stool, what will be the condition of the two armatures after the discharge?
8. Explain the manner of using Volta's condenser.
9. What is the expression for the intensity in the interpolar in terms of the length, section, and resisting power of the interpolar, and of the size of the plates, their distance, and resisting power of the exciting liquid?
10. Explain Arago's experiment as to the influence of a revolving disc of copper on a freely-suspended magnet placed above it.

PHYSICAL GEOLOGY.

DR. HAUGHTON.

1. State the objections to Laplace's Nebular Theory, and the answers to them.
2. What are the ellipticities of the Earth, on the hypotheses of uniform density, and of density infinite at the centre?
3. Demonstrate the error of those geologists who follow Lyell in the supposition that the shape of the Earth may be accounted for by the friction of the Sea only.
4. Define Granite, and describe its several varieties in detail.
5. Define Syenite, and describe its several varieties in detail.

DR. APJOHN.

CHEMISTRY.

1. What is the strongest argument in support of the doctrine that the atmosphere is a *mixture*, not a chemical compound?
2. Describe the means usually employed by chemists for determining the amount of moisture and of carbonic acid in atmospheric air, and the relative quantities of its oxygen and nitrogen.
3. Explain the process for preparing nitric acid, and the means by which muriatic acid, if present, may be detected and removed.
4. When zinc is acted upon by dilute nitric acid, a mixture of two gases is obtained; mention their names, and specify the reactions which give rise to each.
5. An aqueous solution of iodine is decolorized by adding to it a few drops of a solution of hyposulphite of sodium; how is such effect produced?

6. Pure nitric oxide may be obtained from a solution of nitrate of sodium by adding to it certain materials, and applying heat; mention what these materials are, and give the theory of the process.

7. How is gaseous ammonia prepared?—what are its uses in chemical analysis?—and how much oxygen is necessary for burning a cubic inch of the gas?

8. Water impregnated with sulphurous acid dissolves metallic zinc; what are the products formed?

9. Assuming the specific gravity of terfluoride of silicon to be 3.6, what bulk of the gas may be obtained from an avoirdupois ounce of fluor spar, treated in the usual manner?

10. Describe and explain Harcourt's process for estimating nitrogen when present in a solution as nitric acid or a nitrate.

11. How is the soluble phosphate of lime obtained, and made to yield phosphoric acid?

12. What are the methods of preparing the chlorate and perchlorate of potassium; and how, by means of oil of vitriol, may these salts be distinguished from each other?

CRYSTALLOGRAPHY.

1. The edges of a hexahedron may be replaced by tangent planes, or bevelled. What is the name and the notation of the simple form corresponding to each of these modifications?

2. The regular octahedron may have its angles bevelled, the bevelling planes resting symmetrically on two opposite edges; to what simple form do these planes belong, and what is its notation?

3. A six-sided prism terminated by a six-sided pyramid may be a compound form in the third or the fourth system; give the notation of the simple forms in each of these compound forms, and mention the means by which the latter may be distinguished from each other.

4. Enumerate the hemihedral forms of the first, second, and third systems, giving also the name and the notation of each.

History, Political Science, and English Literature.

ENGLISH LITERATURE.

PROFESSOR INGRAM.

1. Trace the following words to their source in the Latin language :—Advantage, arrear, homage, mercy, pioneer, recreant, viands.

2. Write notes on the following words and phrases :—Asleep, methinks, by the bye, goodbye, wo worth the day.

3. Give an account of the writings of Roger Ascham, Sir Thomas More, and Sir Philip Sidney.

4. Give an account (with quotations) of some of the finest lyrical poems of Milton, Gray, Collins, Coleridge, and Shelley.

5. In what way is the phrase "a foregone conclusion" commonly applied? What does it mean in the passage of Shakspeare where it occurs?

6. Explain the allusions in the following lines of Pope :—

- a. "To Bufo left the whole Castalian state."
- b. "Let the two Curlls, of town and court, abuse
His father, mother, body, soul, and muse."
- c. "Who to the *Dean* and *silver bell* can swear,
And sees at Canons what was never there."

POLITICAL ECONOMY.

MR. M'DOWELL.

1. How is the value of money in a country made to conform to the cost of production of the precious metals?

2. As a question of production, the superiority of the large system in agriculture is not so clearly established as in manufactures?

3. It may conclusively be shown that ultimately benefit must result to the labouring class from the use of machinery?

4. A calamity to the labouring class has seldom a self-repairing quality?

5. Describe briefly the influence of custom on rents and on the tenure of land.

6. A permanent alteration in the supply of a commodity susceptible of indefinite multiplication is the consequence, not the cause, of an alteration in its value?

HISTORY.

PROFESSOR BARLOW.

1. What French king's reign may be regarded as the culminating point of the Merovingian dynasty? Give some account of it.

2. What were the leading causes of the decline and fall of that dynasty?

3. What account does Hallam give of the state of France at the time of the accession of Hugh Capet?

4. Write a short account of the reign of Philip Augustus.

5. Who was Robert of Artois? Give some account of his life and adventures.

6. Give Hallam's estimate of the political character of Robert Cecil, Earl of Salisbury.

7. What does he consider to have been the fatal error of that House of Commons which met in October, 1680, and to which the king's triumph may chiefly be ascribed?

8. What was in his opinion the most capital delinquency of the Government of James II., and why? What was the result of these measures?

9. State the principal arguments for and against the Treaty of Utrecht.

10. Write a short account of the first Administration of William Pitt.

Classics.

ARISTOTLE.—ETHICS.

MR. POOLE.

Translate the following passages into English Prose:—

1. *Beginning*, "Ὅτι δ' ἡ χρεία συνέχει ὥσπερ ἔν τι δυν, κ. τ. λ.
Ending, μετρεῖται γὰρ πάντα νομίσματι.
Eth. Nicom., lib. v. cap. v. 13—16.
2. *Beginning*, 'Ἄλλ' ἐπεὶ ὁ μὲν κακῶς βουλευόμενος ἀμαρτάνει, κ. τ. λ.
Ending, καθ' ἣν οὐ δεῖ μὲν τυγχάνει, οὐ μέντοι δι' οὐ ἔδει.
Ibid., lib. vi. cap. x. 3—6.
3. *Beginning*, Εἰ δὴ τῶν μὲν κατὰ τὰς ἀρετὰς πράξεων, κ. τ. λ.
Ending, τοσοῦτ' καὶ ἡ ἐνέργεια τῆς κατὰ τὴν ἄλλην ἀρετῆς.
Ibid., lib. x. cap. vii. 7—9.
4. *Beginning*, 'Ὅμοίως δὲ καὶ ἐπὶ ἀψύχων καὶ ἐπὶ τῶν ζώων, κ. τ. λ.
Ending, 'Ἡ γὰρ ἐπιθυμία, τοῦ ἡδέους, ἢ ἀκολουθεῖ χαίρων.
Eth. Eudem., lib. ii. cap. viii.

1. What is Grant's view as to the origin of the Nicomachean and Eudemian Ethics, and of the Magna Moralia; and by what general considerations does he support it?

2. He points out, by references to the Greek writers, the gradual modifications which arose in the meaning of the word σοφιστής?

3. What appears to have been the special province of the Sophists, and to what circumstances in the history of the time does Grant trace their influence?

4. What main features of Aristotle's system does he trace to Plato?

5. Aristotle, as observed by Grote, attributes to Socrates two most important steps in the progress of Philosophy?

6. Under what circumstances was the power of Athens restored about the date of the birth of Aristotle?

7. What places in the East became the chief centres of Greek influence under the successors of Alexander; and enumerate some of the remarkable literary men who lived at Alexandria under the Ptolemies?

8. Distinguish accurately the terms *ἐπιεικής* and *δίκαιον*; explain the words *εἰρων*, *ἀνθίκαστος*, *χαυνόρης*; and point out the different senses in which the word *νοῦς* is used.

9. Explain the construction of the words *σίρου ἐξαγωγῆς*, and of *εἰ νῦν μὴδὲν δεῖται, ὅτι ἔσται ἰάν δεηθῇ*. in the *first* passage?

10. *a.* With what limitation is the *participle* used in Greek in connexion with verbs?

b. State in what cases the *present indicative* is followed by the *optative* mood.

CICERO.

MR. MAHAFFY.

Translate the following passages:—

1. *Beginning*, M. Marius Gratidianus, propinquus noster,
Ending, percussione hereditates omnium posse convertere?
De Off., lib. iii.
2. *Beginning*, Quam gravis vero, quam magnifica,
Ending, quid philosophia magis colendum aut quid est virtute divinius?
De Fin., lib. iii.
3. *Beginning*, Etenim quis hoc non videt,
Ending, Labor in venatu, sudor, cursus ad Eurotam, fames, sitis.
Tusc. Disp., lib. v.

1. Why and how does Cicero discuss the case of Regulus in the Third Book "De Officiis"? He comments on a celebrated line of Euripides.

2. What was the Epicurean account of the cardinal virtues? Which of them did their system find most difficult to explain?

3. Cicero (in the Second Book "De Finibus") criticizes the ambiguous use of the term *voluptas* in the Epicurean system.

4. Give some account of the history and tenets of the philosophical school to which he belonged. What other systems did he regard with approbation?

5. Sketch a history of the use of *dialogue* in philosophical treatises, and mention those authors (ancient and modern) who seem to have most signally succeeded or failed in this particular.

6. The various sects of Greek philosophers accommodated themselves to the Roman state-policy?

MR. LONGFIELD.

Translate the following passage into Greek Prose:—

Mihi quidem, non apud Medos solum, ut ait Herodotus, sed etiam apud majores nostros, justitiæ fruendæ causa videntur olim bene morati reges

constituti. Nam cum premeretur inops multitudo ab iis qui majores opes habebant, ad unum aliquem confugiebant, virtute præstantem; qui, cum prohiberet injuria tenuiores, æquitate constituenda summos cum infimis pari jure retinebat. Eademque legum constituendarum fuit causa, quæ regum. Jus enim semper quæsitum est æquabile; neque enim aliter esset jus. Id si ab uno justo et bono viro consequerentur, eo erant contenti; cum id minus contingeret, leges sunt inventæ, quæ cum omnibus semper una atque eadem voce loquerentur. Ergo hoc quidem perspicuum est, eos ad imperandum deligi solitos, quorum de justitia magna esset opinio multitudinis. Adjuncto vero, ut iidem etiam prudentes haberentur, nihil erat quod homines his auctoribus non posse consequi se arbitrentur.—CICERO.

Translate the following passage into Greek Tragic Trimeters:—

Lucius. O Cato! arm thy soul with all its patience;
See where the corse of thy dead son approaches!
The citizens and senators, alarmed,
Have gather'd round it, and attend it weeping.

Cato. Welcome, my son! here lay him down, my friends,
Full in my sight, that I may view at leisure
The bloody corse, and count those glorious wounds.
How beautiful is death, when earn'd by virtue!
Who would not be that youth? What pity is it
That we can die but once to serve our country!
Why sits this sadness on your brows, my friends?
I should have blushed if Cato's house had stood
Secure, and flourished in a civil war.

ADDISON.

Translate the following passage into Latin Prose:—

One sophism by which men persuade themselves that they have those virtues which they really want, is formed by the substitution of single acts for habits. A miser who once relieved a friend from the danger of a prison, suffers his imagination to dwell for ever upon his own heroic generosity; he yields his heart up to indignation at those who are blind to merit, or insensible to misery, and who can please themselves with the enjoyment of that wealth which they never permit others to partake. From any censures of the world, or reproaches of his conscience, he has an appeal to action and to knowledge: and though his whole life is a course of rapacity and avarice, he concludes himself to be tender and liberal, because he has once performed an act of liberality and tenderness.—JOHNSON.

Translate the following passage into Latin Hexameters or Elegiacs:—

Along the mead the hallow'd steed
Still wanders whereso'er he will
O'er hill or dale or plain;

No human hand hath trick'd that mane,
 From which he shakes the morning dew ;
 His mouth hath never felt the rein,
 His lips have never froth'd the chain ;
 For pure of blemish and of stain,
 His neck unbroke to mortal yoke,
 Like nature free the steed must be,
 Fit offering for the Immortals he.
 A year and day the steed must stray
 Wherever chance may guide his way,
 Before he fall at Seeva's shrine :
 The year and day have passed away,
 Nor touch of man hath marr'd the right divine.

SOUTHEY.

JUNIOR SOPHISTERS.

Mathematics.

A.

DR. SALMON.

1. Two particles are projected from the same point, at the same instant, with velocities v , v' , and at angles of elevation α , α' ; find the difference between their times of passing through the other point common to both paths.
2. Discuss the motion of a body projected vertically upwards in a medium whose resistance varies as the square of the velocity; the force of gravity being considered constant.
3. A body describes an ellipse, the force acting parallel to the axis minor; find the law of force.
4. Integrate $\frac{dx}{(a + b \cos x)^2}$ and $\frac{dx}{(a + b \tan x)^2}$.
5. Expand the length of an elliptic quadrant in a series proceeding by powers of e .

MR. W. ROBERTS.

6. From the equations of motion of a point in a plane subjected to the action of a force directed to a fixed centre, prove that equal areas are described in equal times.

7. Show that the curve represented by the system of equations,

$$x = \phi + \sin \phi, \quad y = 1 - \cos \phi,$$

is a cycloid; if P , P' be two points corresponding to two values of ϕ , it is required to express the time of descent of a heavy point through the arc

PP' in terms of these values, and hence infer the property of tantochronism possessed by this curve.

8. On a diameter AB of a given circle whose centre is C , let a point P be taken at a distance of one-third of the radius from the centre, so that $AP = 2PC$; through P draw any chord meeting the circle in the points Q, R ; connect Q with B , and let RC produced meet BQ in S ; let the angle $ABQ = \phi$, and $RSB = \psi$. Prove that

$$\frac{d\psi}{d\phi} = \frac{3 \cos \psi}{\cos \phi}.$$

9. Let x, y, z be given in terms of three new variables u, v, w , by the equations

$$20x = uvw,$$

$$12y = \sqrt{(u^2 - 16)(v^2 - 16)(16 - w^2)},$$

$$15z = \sqrt{(u^2 - 25)(25 - v^2)(25 - w^2)}.$$

Prove that

$$dx^2 + dy^2 + dz^2 = Pdu^2 + Qdv^2 + Rdw^2,$$

where

$$P = \frac{(u^2 - v^2)(u^2 - w^2)}{(u^2 - 16)(u^2 - 25)}, \quad Q = \frac{(u^2 - v^2)(v^2 - w^2)}{(v^2 - 16)(25 - v^2)}, \quad R = \frac{(u^2 - w^2)(v^2 - w^2)}{(16 - w^2)(25 - w^2)}.$$

N. B.—It will be sufficient to calculate any one of the quantities P, Q, R .

10. Being given $y = \log \tan \left(\frac{\pi}{4} + \frac{x}{2} \right)$, if the expansion of y in terms of x be

$$y = a_1 x + a_3 x^3 + a_5 x^5 + \dots,$$

show that

$$x = a_1 y - a_3 y^3 + a_5 y^5 - \dots$$

MR. CONNER.

11. Find the angle between the apsides in the orbit described round a centre in which are two forces, the one varying inversely as the square, the other inversely as the cube of the distance.

12. Find the angle at which an imperfectly elastic body, falling *in vacuo* on a plane inclined at 45° , will after the rebound strike the plane.

13. A weight is connected by a string passing over a fixed pulley to the highest point of a cylinder standing on a rough inclined plane; determine whether the weight, being gradually increased, will first draw the cylinder along the plane or upset it.

14. Find the centre of gravity of the segment of a parabola included between the curve and two focal radii.

15. A cylinder is supported by two planes, whose intersection, as well as the axis of the cylinder, is horizontal; the coefficient of friction being given, find the greatest weight that can be suspended from the cylinder by a string coiled round it, without disturbing the equilibrium.

B.

DR. SALMON.

1. A body falls from a tower a ft. in height; when it has fallen through b ft., with what velocity must another be projected from the top of the tower so as to reach the ground in the same time?

2. Find the line of quickest descent to the curve from the focus of a parabola whose axis is vertical and vertex upwards.

3. Integrate completely the equations of rectilinear motion of a body attracted by a force varying inversely as the square of the distance.

4. Two equal ladders connected by a hinge stand on a rough horizontal plane; what is the limiting position of equilibrium.

5. Integrate $\frac{dx}{x^2\sqrt{1+x^2}}$ and $\sin^2x \cos^2x dx$.

6. Find the area and length of a cycloid.

MR. W. ROBERTS.

7. Let A, B be two material points, whose weights are a and b , C their centre of gravity, and P any point whatever; it is required to prove that

$$a\overline{PA}^2 + b\overline{PB}^2 = (a+b)\overline{PC}^2 + \frac{ab}{a+b}\overline{AB}^2.$$

8. The feet of two inclined planes with a common vertex are given; find the locus of the vertex when the time of descent down the two planes is the same.

9. With a given initial velocity, at what angle of elevation must a heavy body be projected in order that the area of the parabola described may be the greatest possible?

10. If x and y are given as functions of t by the equations

$$x = f(t), \quad y = F(t),$$

find the value of $\frac{dy}{dx}$ in terms of t .

11. Being given the equation

$$\{\sqrt{x-a} + \sqrt{x-b}\} \{\sqrt{y-a} + \sqrt{y-b}\} = c,$$

show that the elimination, by differentiation, of the constant c leads to a result of the form

$$f(x) dx + F(y) dy = 0,$$

and find the values of $f(x)$, $F(y)$.

12. Being given

$$du = \frac{(x^2 - 3) dx}{x^3 - 7x + 6},$$

find the value of u .

MR. CONNER.

13. A window sash is 4 ft. wide and 18 in. high; find the greatest distance from the middle at which it can be raised with one hand, the coefficient of friction being 0.62.

14. A rectangular vessel rests on a rough incline, two opposite sides of the base being horizontal; find the quantity of water that may be poured in without upsetting it.

15. Find the work lost by the impact of two imperfectly elastic bodies.

16. A body attached by a string to a fixed point revolves in a vertical plane round it with a minimum velocity; how far is the strength of the string thereby tested?

17. Find the time in which a body projected with a given velocity towards a centre of force will reach the centre, the force varying as the distance.

18. Find the integral $\int \frac{(1-x^2)^{\frac{1}{2}} dx}{x^2}$.

History and English Literature.

ENGLISH LITERATURE.

PROFESSOR INGRAM.

1. Explain the meanings of the following words, and assign their derivations:—authentic, Cardinal, dragoman, Leonine, malingerer, rubric, tontine, watershed.

2. Write notes on the etymology of the following words:—assassin, bran-new, dirge, fairy, huckster, parchment, slave, tawdry, thralldom.

3. Comment on the italicized words in the following sentences:—

a. "We cannot always be contemplative, or *pragmatical* abroad."

b. "Zeal, . . . arming in complete *diamond*."

c. "This bird of prey *resented* a worse than earthly savour."

d. "Confined and *pester'd* in this pinfold here."

e. "We took up our *carriages*, and went up to Jerusalem."

f. "The poor man that hath nought to lose, is not afraid of the *sy-cophant*."

4. Point out the places to be assigned to the following tongues in a complete and accurate classification of living and dead European languages:—The Swedish, the Breton, the Bohemian, the Occitanian, the Dutch, the Gaelic, the Portuguese, the Frankish, the French.

5. Describe the changes in the composition and character of the English language produced by each of the following causes:—The Danish Conquest, the Norman Conquest, the Revival of Learning, the Reformation, the Restoration, the recent Progress of the Sciences.

6. *a.* Compare the principal English writers with relation to the predominance of the Saxon or Latin element in their vocabularies.

b. Point out the cautions which must be attended to in instituting such comparisons.

7. Quote parallels from Shakspeare for the meanings of the italicized words in the following sentences of Chaucer:—

a. "And peined hire to contrefeten *chere*
Of court."

b. "The wisdom of an *hepe* of lered men."

c. "What should he studie and make himselfen *wood*?"

d. "He hadde in *danger* at his own gise" . . .

e. "But all that he might of his frendes *hente*" . . .

f. "In felawship wel coude she laughe and *carpe*."

g. "And knew hir conseil and was of hir *rede*."

8. Explain the following words and phrases which occur in Chaucer's Prologue:—Chevisaunce, corage, culpon, galingale, laton, mormal, nete, parvis, perse, purfled, raught, rouncie, taille, webbe; "this ilke knight," "for the maistrie," "over all ther he came," "alway after on."

HISTORY.

PROFESSOR BARLOW.

1. What circumstances led to the introduction of the Lombards into Italy? Give a short account of the history of the Lombard period, stating, in particular, the causes of the decline and fall of their kingdom.

2. The reign of Frederic Barbarossa was of extreme importance in Italian history; write a short account of it.

3. Relate the history of the Austrasian and Neustrian queens, Brunehaut and Fredegonda.

4. What was the Treaty of Verdun? and what events led to a general pacification?

5. What account does Hallam give of the causes which led to the first Crusade?

6. Give his sketch of the reigns of Henry III., IV., and V. of Germany.

7. What is Hallam's opinion as to the existence of an elective Bretwalda during the Heptarchy? and what are his reasons for it?

8. Draw up a genealogical table showing the descent of Henry II. of England from Egbert.

9. What are the principal instances of the tyranny of William I. which are mentioned by Hallam?

10. Write short accounts, giving dates, of the following events in English history:—The Battle of the Standard, the Massacre on St. Brice's Day, the Battle of Senlac, the Rout of Winchester.

Experimental Physics.

MR. GALBRAITH.

1. By weighing a glass globe when exhausted, and when filled with gas at the temperature 17°C and pressure 750^{mm} , the weight of the gas is found to be 6.3 grams; by gauging the globe at 0° , its contents are found to be 9 liters. Find the specific gravity of the gas.

2. What is the internal diameter of the globe at 17° , measured in millimeters, also in inches?

3. Prove the following formula for the relative volume of steam in metric measures :

$$\text{Rel. vol.} = 346 \frac{273 + t}{p^{\text{cm}}}.$$

4. From the French Commissioners' formula, find the elastic force of steam at 300°F ., both in lbs. per square inch, also in inches of mercury.

5. Reduce the temperature in the last question to the Centigrade scale, and the pressure to centimeters of mercury.

HEAT.

DR. APJOHN.

1. Two metallic bars, one of platinum, the other of copper, are placed in a right line, their adjacent ends being distant $\frac{1}{16}$ th of an inch, and their remote ends abutting against fixed obstacles. The length of the former is 60, and that of the latter 112 inches, at the temperature of 60° , and their co-efficients of expansion for one degree Fahrenheit are 0.0000049 and 0.0000095. To what common temperature must the two bars be raised in order that their free ends shall come in contact?

2. If air at t° Fahrenheit has an elastic force represented by f' , and that when heated under a constant volume it becomes f'' , to what temperature must it have been raised?

3. Deduce the exact relation between e , a , and k , e being the coefficient of absolute expansion of a gas or liquid, a the coefficient of its apparent expansion, and k the coefficient of the cubic expansion of glass.

4. How many gallons of water at 60° and at 212° should be mixed in order to give a ten-gallon bath at 98° ?

5. Five lbs. of ice at 20° are projected into 21 lbs. of water at 200° ; what will be the temperature of the mixture? N. B.—The specific heat of ice = 0.502.

6. How many lbs. of water at 212° must be added to 3 lbs. of ice at 9° , so that the mixture shall have the temperature of 57° ?

7. m grains of a liquid converted into vapour at temperature t , and having a pressure p , had the bulk of n cubic inches; what is its specific gravity?

8. Assuming the law of cooling of Newton, a differential thermoscope measures correctly the amount of caloric which falls upon one of its balls; why is this the case?

9. What is the experimental proof that the energy of radiation of a hot body bounded by plane surfaces is proportional to the sines of the angles made by the emitted rays with such surface?

10. How did Dulong and Petit prove experimentally that the radiating power of a hot body was proportional to its absorbing power?

Classics.

EURIPIDES.

MR. MAHAFFY.

Translate the following passages into English:—

1. *Beginning*, 'Ανὰ δ' ἐλάταισι στεφανώδει τε χλόα, κ. τ. λ.
Ending, γαῖαν ἐκπυρώσων.
Iph. in Aul., 1058-69.
2. *Beginning*, 'Η μίγα μοι τὰ θεῶν μελεδήμαθ', ὅταν φρενὰς ἔλθῃ, κ. τ. λ.
Ending, Λατοῦς βαθείαν ἀνὰ χλόαν.
Hippol., 1102-17
3. *Beginning*, καὶ ταῦθ' ἄμ' ἡγόρευε καὶ πετρούμενος, κ. τ. λ.
Ending, νικῆς τε σῆμα καὶ τὸ τῶν ἡσσωμένων.
Phœn., 1177-81, 1255-9.
4. *Beginning*, 'Εγὼ πέφυκα γραμμάτων μὲν οὐκ ἴδρις, κ. τ. λ.
Ending, τὸ λοίσθιον δὲ τῷ τρίτῳ προσεμφερές.
Frag. (vii. of the Frag. of the Theseus.)
5. *Beginning*, πολλοὶ δ' Ἀχαιῶν ἐν δορὶ καὶ πετρίναις, κ. τ. λ.
Ending, δόλιον ἀστέρα λάμψας.
Hel., 1122-32

1. The words *κερτομεῖν*, *δυστυχεῖν*, *φθείρειν*, *προσαιτεῖν*, and *μωρία* are used in peculiar senses in Tragic writers?

2. The Prologue, and the *Deus ex Machina*, as peculiar to Euripides may both be accounted for on the same principles?

3. Explain the importance of *messengers* in Greek Tragedy. How do Euripides' tragedies differ from preceding ones in this respect, and why?

4. Give an outline of the principal criticisms of Aristophanes on Euripides, and discuss their fairness.

5. K. O. Müller notices six of Euripides' extant Tragedies as containing references to contemporary political events?

6. What inference does Mr. Grote draw from the relations between Nicias and the Athenians during the Sicilian expedition?

7. Discuss the Satyric Drama, and its peculiarities in (α) subject-matter, (β) metre, and (γ) vocabulary.

8. Notice the perfections of Euripides as a poet, *referring to particular passages.*

PLAUTUS AND TERENCE.

MR. POOLE.

Translate the following passages into English Prose :—

1. *Beginning, Eu.* Foras, foras, lumbrice, qui sub terra erepsisti modo ! . . .
Ending, Str. Larus hunc atque intemperie insanisæque agitant senem.
Aulularia, act iv. sc. 4.
2. *Beginning, An.* Menæchme, amare ait te multum Erotium,
Ending, Et palla et spinther faxo referantur simul.
Menæchmei, act iii. sc. 3.
3. *Beginning, N.* Demipho, te appello ? nam me cum isto distædet loqui
Ending, Habet hæc, eji quod, dum vivat, usque ad aurem ogganniat.
Phormio, act v. sc. 8.
4. *Beginning, Ph.* Novi ego hoc seculum moribus quibu' sit.
Ending, Hæc tibi si mea imperia capesses, multa bona in pectore consistent.
Trinummus, act ii. sc. 2.
5. *Beginning, Ph.* Nil aput me tibi.
Ending, Profecto in hac re nil mali est, quod sit discidio dignum.
Hecyra, act v. sc. 2.

1. Compare Plautus and Terence in their relation to the Greek Drama. Nævius seems to have resembled the old Attic Comedy more than Plautus ?

2. It was not unnatural that the attacks made on Terence should have occurred ; how far were these attacks on the translators of Greek Comedies justifiable ?

3. With what part of the old Greek Comedy did the prologue of the Latin Comedy correspond most nearly ; and why ?

4. Give instances of Greek words introduced in the Latin of Plautus ; and notice the circumstances of the times which rendered such terms intelligible to the Roman populace ?

5. Point out the circumstances which must have made the Roman Comedies very different from their Greek originals.

6. Show how the peculiar mode of performing the *cantica* became necessary ; and how far they answered the purposes of the Greek Chorus.

7. Give some account of the political state of Greece, and the relations of Rome with it, during the period in which Plautus and Terence wrote.

8. Where, according to Bentley, are other metres than the *iambic* and *trochaic* admitted in Terence?

9. He assigns a reason why the rules of Greek verse are so often violated by the Roman Dramatists?

10. Translate, and write explanatory notes on, the following passages:—

- a. "Quid tibi ergo meam me invito tactio est."
 b. "Quo quidem agno sat scio
 Magis curionem nusquam esse ullam beluam."
 c. "Quum inspicio marsupium
 Viaticati hercle admodum æstive sumus."
 d. "Adeon' te esse incogitantem atque imprudentem, Phædria,
 Ut phaleratis dictis ducas me: et meam ductes gratiis."

11. Scan, and state the metres of, the following lines:—

- "Rem necesse est loqui quidquid egi atque ago."
 "Atque adeo ne me nequidquam serves ob eam industriam."
 "Proin tu solitudinem istam falsam quæ te excruciat mittas."
 "Cujus tu fidem in pecunia perspexeris."

MR. LONGFIELD.

Translate the following passage into Greek Prose:—

All fear is in itself painful, and when it conduces not to safety is painful without use. Every consideration, therefore, by which groundless terrors may be removed, adds something to human happiness. It is likewise not unworthy of remark, that in proportion as our cares are employed upon the future they are abstracted from the present, from the only time which we can call our own, and of which if we neglect the apparent duties, to make provision against visionary attacks, we shall certainly counteract our own purpose; for he, doubtless, mistakes his true interest, who thinks that he can increase his safety, when he impairs his virtue.—JOHNSON.

Translate the following passage into Greek Tragic Trimeters:—

This is the secret centre of the isle:
 Here, Romans, pause, and let the eye of wonder
 Gaze on the solemn scene; behold yon oak,
 How stern he frowns, and with his broad brown arms
 Chills the pale plain beneath him: mark yon altar,
 The dark stream brawling round its rugged base,
 These cliffs, these yawning caverns, this wide circus,
 Skirted with unhewn stone: they awe my soul,
 As if the very genius of the place

Himself appeared, and with terrific tread
 Stalk'd through his drear domain. And yet, my friends,
 (If shapes like his be but the fancy's coinage)
 Surely there is a hidden power, that reigns
 'Mid the lone majesty of untamed nature,
 Controlling sober reason; tell me else,
 Why do these haunts of barb'rous superstition
 O'ercome me thus? I scorn them, yet they awe me.
 Call forth the British princes: in this gloom
 I mean to school them to our enterprise.

MASON'S *Caractacus*.

Translate the following passage into Latin Prose:—

Whether fame, or conquest, or riches, were the object of Alaric, he pursued that object with an indefatigable ardour, which could neither be quelled by adversity, nor satiated by success. No sooner had he reached the extreme land of Italy, than he was attracted by the neighbouring prospect of a fertile and peaceful island. Yet even the possession of Sicily he considered only as an intermediate step to the important expedition which he already meditated against the continent of Africa. The straits of Rhegium and Messina are twelve miles in length, and, in the narrowest passage, about one mile and a half broad; and the fabulous monsters of the deep, the rocks of Scylla, and the whirlpool of Charybdis, could terrify none but the most timid and unskilful mariners. Yet as soon as the first division of the Goths had embarked, a sudden tempest arose, which sunk or scattered many of the transports; their courage was daunted by the terrors of a new element; and the whole design was defeated by the premature death of Alaric, which fixed, after a short illness, the fatal term of his conquests. The ferocious character of the barbarians was displayed in the funeral of a hero, whose valour and fortune they celebrated with mournful applause. By the labour of a captive multitude, they forcibly diverted the course of the Busentinus, a small river that washes the walls of Consentia. The royal sepulchre, adorned with the splendid spoils and trophies of Rome, was constructed in the vacant bed: the waters were then restored to their natural channel; and the secret spot, where the remains of Alaric had been deposited, was for ever concealed by the inhuman massacre of the prisoners who had been employed to execute the work.—GIBBON.

Translate the following passage into Latin Verse:—

Now I gain the mountain's brow,
 What a landscape lies below!
 No clouds, no vapours intervene;
 But the gay, the open scene,
 Does the face of Nature show,
 In all the hues of heaven's bow;
 And swelling to embrace the light,
 Spreads around, beneath the sight.
 Old castles on the cliffs arise,
 Proudly towering in the skies!

Rushing from the woods, the spires
 Seem from hence ascending fires !
 Half his beams Apollo sheds
 On the yellow mountain-heads !
 Gilds the fleeces of the flocks,
 And glitters on the broken rocks !
 Below me trees unnumber'd rise,
 Beautiful in various dyes :
 The gloomy pine, the poplar blue,
 The yellow beech, the sable yew,
 The slender fir that taper grows,
 The sturdy oak with broad-spread boughs.

DYER.

SENIOR FRESHMEN.

Mathematics.

DR. SALMON.

1. Find the locus of the intersection of tangents to a parabola which cut at a given angle.

2. Two conics, $ax^2 + 2hxy + by^2 + 2gx = 0$,
 $a'x^2 + 2h'xy + b'y^2 + 2g'x = 0$,

touch each other ; what is the condition that they should touch again ?

3. Normals to the parabola $y^2 = px$ are drawn at two given points on the curve $x'y'$, $x''y''$, and from their intersection a third normal is drawn to the curve ; find the co-ordinates of the point at which it is a normal.

4. A man draws balls from an urn, it being an even chance each time whether he draws a white ball or a black ball ; what is the chance that in three trials he draws a white ball twice running ?

5. What is the quotient when the determinant

$$\begin{vmatrix} a^3 & b^3 & c^3 \\ a & b & c \\ 1 & 1 & 1 \end{vmatrix}$$

is divided by $(b-c)(c-a)(a-b)$?

6. In a spherical triangle, if the sum of the base angles be equal to the vertical angle, prove that

$$\sin^2 \frac{1}{2}a + \sin^2 \frac{1}{2}b = \sin^2 \frac{1}{2}c.$$

MR. CONNER.

7. Transform $12x^2 - 6xy + 4y^2 - 2y + 1 = 0$ to the axes.

8. Two similar ellipses are in exterior contact at the extremities of their greater axes ; find the length of the common tangent between the points of contact.

9. Find the eccentricity of the ellipses whose equal conjugate diameters coincide with two given lines.

10. Give a formula, suited to logarithmic computation, for expressing an angle of a spherical triangle in terms of one of the other angles and the sides containing it.

11. Find $\tan 6\theta$, if $\tan \theta = \frac{1}{13}$.

12. Find the symmetric function $\Sigma \alpha^2 \beta$ of the equation

$$x^3 - 6x^2 + 14x - 28 = 0.$$

MR. WILLIAMSON.

13. If through any point on an equilateral hyperbola two chords be drawn at right angles, prove that the right line joining their extremities is parallel to the normal at the point.

14. In a spherical triangle, prove the formula,

$$\sin^2 \frac{c}{2} = \sin \left\{ \frac{1}{2} (a + b) + \theta \right\} \cdot \sin \left\{ \frac{1}{2} (a + b) - \theta \right\},$$

where θ is determined from the expression

$$\sin \theta = \cos \frac{C}{2} \sqrt{\sin a \sin b}.$$

15. In a parabola, find the locus of the intersection of normals at right angles to each other.

16. Find the sum of the fourth powers of the roots of the equation

$$x^4 - x^3 - 19x^2 + 49x - 30 = 0.$$

17. Find the locus of a point such that the four tangents drawn from it to two given intersecting circles shall form a harmonic pencil.

18. Prove the formula in Spherical Trigonometry,

$$\cot \frac{\Sigma}{2} = \frac{\cot \frac{a}{2} \cot \frac{b}{2} + \cos C}{\sin C}.$$

DR. SALMON.

1. If a and b be two sides of a spherical triangle; if γ and p be the base and perpendicular of the corresponding plane triangle, prove that the base of the spherical triangle is approximately

$$c = \gamma \left(1 - \frac{p^2}{6r^2} \right).$$

2. Find in trilinear co-ordinates the equation of the circle circumscribing the triangle formed by the lines γ , $\alpha - \gamma$, $\beta - \gamma$.

3 Find the system of conditions that both roots of the quadratic

$$ax^2 + bxy + cy^2$$

may be roots of the cubic $Ax^3 + Bx^2y + Cxy^2 + Dy^3$.

4. Given a fixed circle $x^2 + y^2 + 2lx + 2my + n$, and another circle whose centre is α, β , and which passes through the origin; on the supposition that α is fixed, and β variable, find the locus of the intersection of the radical axis of the two circles with the line joining $\alpha\beta$ to the origin.

5. Prove that the area of the triangle formed by three tangents to an ellipse at points whose eccentric angles are α, β, γ , is

$$ab \tan \frac{1}{2}(\alpha - \beta) \tan \frac{1}{2}(\beta - \gamma) \tan \frac{1}{2}(\gamma - \alpha).$$

MR. CONNER.

6. Find the area of the triangle formed by tangents to the parabola $y^2 = px$ and the line joining the points of contact, in terms of the co-ordinates of those points.

7. Prove that the area of the triangle formed by the tangent and the central radius and perpendicular, is constant for the series of points on confocal ellipses at which the tangents are parallel.

8. Apply the method of Des Cartes to the solution of the equation

$$20x^4 + 16x^3 - 39x^2 + 17x - 2 = 0.$$

9. Express the cosine of the arc joining the vertices of two spherical triangles, having a common base, in terms of the sides of the triangles.

10. Prove that the sines of angles in the same segment of a small circle of the sphere are as the product of the secants of the halves of the arcs containing those angles.

MR. WILLIAMSON.

11. Prove that the inscription of a quadrilateral of minimum perimeter in a given quadrilateral is impossible, unless the given quadrilateral be inscribable in a circle, in which case the number of solutions is infinite. Prove also that, in the latter case, their common perimeter is $\frac{dd'}{R}$, where d and d' are the diagonals, and R is the radius of the circumscribing circle.

12. Find the equation of the circle which passes through the middle points of the sides of the triangle $\alpha = 0, \beta = 0, \gamma = 0$; and prove that it touches the circle inscribed in the given triangle.

13. If two chords of an ellipse intersect at right angles, and touch the same confocal conic, the sum of their reciprocals is constant?

14. Prove that the product of two determinants of the third order is another determinant.

15. Given a tangent to a lesser circle on a sphere; find the locus of the intersection of two other tangents which intercept a quadrantal arc on the given tangent.

Classics.

PLATO.

MR. LONGFIELD.

Translate the following passages :—

1. *Beginning*, Ταῦτα δὴ λογιζόμενος ἄσμενος εὐρηκέναι ᾤμεν, κ. τ. λ.
Ending, βέλτιστον αὐτὰ οὕτως ἔχειν ἐστίν, ὥσπερ ἔχει. Phædo, 46.
2. *Beginning*, Οὕτως οἶου καὶ νῦν, ὅστις σοι ἀδικώτατος, κ. τ. λ.
Ending, διαφέρει ἡμῶν προβιβάσαι εἰς ἀρετὴν, ἀγαπητόν. Protagoras, 16.
3. *Beginning*, Ἀλλὰ μὲν δὴ καὶ ὥς γε σὺ λέγεις δεινὸς ὁ βίος, κ. τ. λ.
Ending, διὰ τὴν ἀπληστίαν ἀπεικάσας. Gorgias, 47.
4. *Beginning*, Εἰ δέ γε παρηνέχθημὲν τι τότε, κ. τ. λ.
Ending, μαλλον ἢ μετὰ φρονήσεως αὐτὸν τινός. Philebus, 37.

1. Mention some circumstances which may account for the decay of the power of Sparta about the end of the fourth century B. C.
2. Give an account of the treaty called the Peace of Antalcidas. What were the first subsequent aggressions of Sparta on Thebes?
3. Give a sketch of the career of Pelopidas.
4. Mention the circumstances connected with the founding of Megalopolis. What eminent men did this city produce?
5. Give some account of the three battles that were fought at Mantinea.
6. Narrate the history of the 10,000 subsequent to their reaching the Euxine.
7. Illustrate by a map the topography of ancient Athens and its vicinity.
8. Discuss the question whether the Platonic Apology represents the actual defence of Socrates before his judges.
9. Why did Plato naturally adopt the form of dialogues for his philosophical writings?
10. How does Mr. Grote argue that the character of the Athenian people was not corrupted by the teaching of the Sophists?
11. Write grammatical notes on the following passages :—
 - a. μάλιστα δὲ αὐτῶν ἐν εθαύμασα τῶν πολλῶν ὧν ἐψεύσαντο. — *Apol.* 1.
 - b. δεῖ δὲ ὑμῖν τὴν ἐμὴν πλάνην ἐπιδείξαι, ὥσπερ πόνους τινὰς ποιοῦντος.—7.

c. ὥστε πολλὰς διαβολὰς ἀπ' αὐτῶν γεγονέναι, ὄνομα δὲ τοῦτο λέγεσθαι, σοφὸς εἶναι.—9.

d. χρημάτων μὲν οὐκ αἰσχύνη ἐπιμελόμενος, ὅπως σοι ἔσται ὡς πλεῖστα.—17.

e. τί ἄξιός εἰμι παθεῖν ἢ αποτῖσαι, ὅτι μαθὼν ἐν τῷ βίῳ οὐχ' ἡσυχίαν ἤγον.—26.

12. Write notes on the derivation of the words προῖκα, σφοδρός, κίνδυνος, ἀθρόος, μηχανή, αὐτόματος, ἀμείβω.

CICERO.—LETTERS.

MR. MAHAFFY.

Translate the following passages :—

1. *Beginning*, Thermus cum Silano contendere existimatur,

Ending, ut nulla daretur uti rogas.

Epp., lib. i. 1.

2. *Beginning*, Cura, amabo te, Ciceronem nostrum.

Ending, Aliquid ex ejus sermone poterimus περὶ τῶν ὅλων suspicari.

lib. ii. 2-3.

[No credit will be allowed for the above passages except they are *explained* as well as translated.]

3. *Beginning*, Nihil εὐκαιρότερον epistola tua,

Ending, Id est 'Αβδηρικόν.

lib. iv. 7.

1. Cicero has left us an Apology for his political conduct? Give an abstract of it.

2. What was a *libera legatio*? Cicero brought in a bill on the subject?

3. State the principal measures by which the Roman nobility tried to overthrow the constitution of C. Gracchus, giving dates. How far were they successful?

4. Write an estimate of the character and exploits of Cn. Pompeius Magnus.

5. The influence of the mercantile party in Roman affairs during the second century B. C. is seen in several important cases?

6. State the real character of Agrarian Laws. When and what were the principal agitations concerning them?

7. Write a short essay on Roman national character.

8. Describe and discuss the Roman system of taxation.

MR. POOLE.

Translate the following passage into Greek Prose :—

There is but one thing necessary to keep the possession of true glory, which is, to hear the opposers of it with patience; and preserve the virtue by which it was acquired. When a man is thoroughly persuaded that he ought neither to admire, wish for, or pursue anything but what is exactly his duty, it is not in the power of seasons, persons, or accidents, to diminish his value. He only is a great man who can neglect the applause of the multitude, and enjoy himself independent of its favour. This is indeed an arduous task; but it should comfort a glorious spirit that it is the highest step to which human nature can arrive. Triumph, applause, acclamation, are dear to the mind of man; but it is still a more exquisite delight to say to yourself, you have done well, than to hear the whole human race pronounce you glorious, except you yourself can join with them in your own reflections. A mind thus equal and uniform may be deserted by little fashionable admirers and followers, but will ever be had in reverence by souls like itself. The branches of the oak endure all the seasons of the year, though its leaves fall off in autumn; and these too will be restored with the returning spring.—SPECTATOR.

Translate the following passage into Greek Verse :—

Now, York, or never, steel thy fearful thoughts,
 And change misdoubt to resolution :
 Be that thou hop'st to be, or what thou art
 Resign to death; it is not worth the enjoying.
 Let pale-fac'd fear keep with the mean-born man,
 And find no harbour in a royal heart.
 Faster than springtime flowers comes thought on thought,
 And not a thought but thinks on dignity.
 My brain, more busy than the labouring spider,
 Weaves tedious snares to trap mine enemies.
 Well, nobles, well; 'tis politickly done,
 To send me packing with a host of men :
 I fear me you but warm the starved snake,
 Who, cherished in your breasts, will sting your hearts.

SHAKESPEARE.

Translate the following passage into Latin Prose :—

So long as Appius Claudius took active part in public life, in his official conduct, as well as in his general carriage, he disregarded laws and customs on all hands with a hardihood and sauciness worthy of an Athenian; till, after having long retired from the political stage, the blind old man, returning as it were from the tomb at the decisive moment, overcame Pyrrhus in the senate, and first formally and solemnly proclaimed the complete sovereignty of Rome. But the gifted man came too early or too late; the gods made him blind on account of his untimely wisdom. It

was not individual virtues that ruled in Rome, and through Rome in Italy, but the one immoveable idea of a policy—propagated from generation to generation in the senate—with the leading maxims of which the senators' sons were already imbued, when in the company of their fathers they made their appearance in the senate hall, and there listened to the wisdom of the men whose seats they were destined at some future time to fill. Immense successes were thus obtained at an immense price; for Nike too is followed by her Nemesis. In the Roman commonwealth nothing specially depended on any one man, either on soldier or on general; and under the rigid discipline of its moral police all the idiosyncrasies of human character were extinguished.—**MOMMSEN'S ROME.**

Translate the following passage into Latin Lyric Verse:—

Bright flower whose home is everywhere,
A pilgrim bold in Nature's care,
And all the long year through the heir
Of joy or sorrow,

Methinks that there abides in thee
Some concord with humanity;
Given to no other flower I see
The forest thorough.

Is it that man is soon depress'd,
A thoughtless thing, who once unblest,
Does little on his memory rest,
Or on his reason,
And thou wouldst teach him how to find
A shelter under every wind,
A hope for times that are unkind,
And every season?

Thou wanderest the wide world about,
Unchecked by pride or scrupulous doubt,
With friends to greet thee, or without,
Yet pleased and willing;
Meek, yielding to th' occasion's call,
And all things suffering from all,
Thy function apostolical
In peace fulfilling.

WORDSWORTH.

Logics.

DR. WEBB.

1. Point out the various ways in which Words come to have two meanings.

2. State Whately's account of the distinction between *First* and *Second Intentions*; and show that this account differs from that of the older Logicians.

d

3. The objection to Syllogism as necessarily involving a *Petitio Principii* evinces an ignorance both of the nature of Syllogism and of the object of Reasoning?

4. The distinction taken by Whately between the two kinds of Discovery enables us to expose the fallacies which underlie certain speculations of Plato and of Clarke?

5. Exemplify and explain the errors which have been introduced into Philosophy by the secondary use of the word *Same*.

MURRAY'S LOGIC.

DR. MALET.

1. If an extreme be universal in premiss, and particular in conclusion, investigate all the different modes which could result, and show—

a. How many of them are admissible.

β. Are the rest illegitimate?

γ. What feature is common to them all.

2. In point of fact, the mode Bramantip could be shown to be equally useless with the others?

3. In the fourth figure, determine the mode—

a. When the major premiss is particular.

β. When the minor premiss is particular.

γ. When the conclusion is universal.

δ. When the minor premiss is negative.

4. In no other case does the mere quantity or quality of a proposition determine the mode?

5. In applying *Reductio ad impossibile* to the four different figures, show in what cases it is applicable or not to each of them, and when the order of terms in the new conclusion will be the same as that in the suppressed premiss, or different from it.

6. In substituting conclusion for a premiss, the new premisses cannot be legitimate if the *suppressed* premiss be particular.

7. One kind of proposition classed by Murray with those compounded in words, is compounded both in sense and words. Show which it is, and give an example.

MR. ABBOTT.

1. Convert and contradict the following propositions:—

a. The ancient Romans were once a mighty people.

b. All wise men were once infants.

c. Fuit Ilium.

2. State the following arguments in syllogistic form, and point out the fallacy, if any:—

a. Food is necessary to life;

All food is either animal or vegetable;

Animal food is not necessary to life;

Therefore vegetable food is necessary to life.

- b.* Animal food may be wholly dispensed with; and so also may vegetable food;
But all food is either animal or vegetable;
Therefore all food may be dispensed with.
- c.* A is greater than B , and less than C ;
Therefore C is greater than B .
- d.* A is son of B , B is son of C ;
Therefore A is grandson of C .
3. What are the errors with respect to the nature and object of Logic exposed by Whately?

JUNIOR FRESHMEN.

Mathematics.

A.

DR. SALMON.

1. Given two points, A, B ; a circle is described with centre A , and any radius; find the locus of the points of contact of tangents to the circle which are perpendicular to the tangents which may be drawn from B .

2. At the extremity of the base of a triangle a parallel is drawn to the bisector of vertical angle meeting the bisector of the base in M ; and also a perpendicular is drawn to the adjacent side meeting the external bisector of the vertical angle in N ; prove that MN is perpendicular to the base.

3. A perpendicular is erected to the base of a triangle at the same distance from one end of the base which the perpendicular of the triangle is from the other; prove that the intercept on this perpendicular by the two bisectors of the vertical angle is constant if the base and vertical angle are given.

4. If the polars be taken of the middle points of the sides of a triangle with regard to the inscribed circle, the triangle so formed is equal in area to the original triangle?

MR. W. ROBERTS.

5. Being given a point P within a triangle ABC , let a, b, c be the feet of perpendiculars let fall from P on the sides BC, AC, AB , respectively; it is required to determine another point Q such that if d, e, f be the feet of perpendiculars dropped from it on BC, AC, AB , the rectangles under Pc and Qf , under Pb and Qe , and under Pa and Qd , may be all equal.

6. If the point P , in question 5, describe a line passing through one of the vertices of the triangle ABC , find the locus of the point Q .

7. Being given a parallelogram $ABCD$, let a line drawn through C cut the diagonal BD in E , the side AB in F , and the side AD produced in G ; it is required to prove that EG is to EF in the duplicate ratio of EC to EF .

8. The base AB of a triangle ABC is given; let M be the middle point of AB , and P the foot of the perpendicular let fall from A on B . If PM is to the diameter of the circle circumscribed to the triangle ABC , as the area of ABC is to the square of AB , it is required to find the locus of the vertex C .

MR. CONNER.

9. Construct a triangle such that its vertices may be on given lines, and two of its sides pass through given points, while the third is parallel to a given line.

10. A pair of opposite sides of a quadrilateral are divided in a given ratio, and the other pair in another given ratio; find the ratio of the segments of the lines connecting the points of section of opposite sides.

11. Given the latter two lines, and the angle between them and the diagonals; construct the quadrilateral.

12. Construct a triangle, given two sides and the rectangle under the third side and bisector of opposite angle.

B.

DR. SALMON.

1. A line AD , drawn from the vertex A of an isosceles triangle to the base, meets the circumscribing circle in M ; prove that the rectangle $AD \cdot AM$ = the square of the side of the triangle. Prove the propositions of Euclid assumed in your proof.

2. Perpendiculars are erected at the extremities of any chord of a circle to meet any diameter; prove that the rectangle under the perpendiculars is equal to the difference between the squares of the radius and of half the intercept on the diameter.

3. Find the vertical angle of a triangle if the square of the base exceed the sum of the squares of the sides by the rectangle under them; or if it exceed the same sum by four times the area.

4. Given vertical angle, and sum or difference of sides; find the locus of the centre of the circumscribing circle.

5. Through the point of intersection of two circles, draw a line such that the rectangle under its intercepts may be a maximum.

6. Give Plato's and Philo's methods of finding two mean proportionals between two given lines.

MR. W. ROBERTS.

7. Construct a right-angled triangle such that one of the sides may be a mean proportional between the hypotenuse and the other side.

8. Let $ABCD$ be a quadrilateral inscribable in a circle; prove that perpendiculars drawn through B to AC , through C to the diagonal AD , and through D to AB , pass through the same point.

9. Let a perpendicular to the base AB of a triangle, drawn through its middle point M , meet the bisector of the external angle at the vertex C in the point P , and let a perpendicular be dropped from P on AC . If Q be the foot of this perpendicular, prove that the line MQ will be parallel to the bisector of the vertical angle ACB .

10. Let two right lines, perpendicular to each other, and cutting at a given point A , meet two given parallel lines in the points B , C , respectively; find the locus of the intersection of BC with a perpendicular dropped upon it from A .

11. Let the sides AC , BC of a right-angled triangle be the segments of a line cut in extreme and mean ratio; if P be the foot of the perpendicular dropped from the right angle C on the hypotenuse AB , and M the middle point of the hypotenuse, prove that CP will be twice PM .

12. If the area of a triangle ABC be the fourth part of the rectangle under the sides AB , BC , find the angle included between their sides.

MR. CONNER.

13. Prove that the minimum triangle of a given species inscribable in a given triangle is that at whose vertices the perpendiculars to the sides of the given triangle meet in a point.

14. Find the locus of the centres of circles which cut two fixed circles at right angles.

15. Prove that the rectangle under the chords of two arcs of a circle is equal to the difference of the squares of the chords of half their sum and of half their difference.

16. Find a point the sum of whose distances from three given points shall be a minimum.

17. Through a point inside a circle draw a line such that the difference of the squares of its segments may be given.

18. Express the area of a triangle in terms of its three perpendiculars.

C.

DR. SALMON.

1. How many gallons of water will be required to fill a swimming-bath 35 yards long, 12 yards wide, and 6 feet deep, a gallon being equal to 277.274 cubic inches?

2. The base of a triangle is 10 feet long, and the bisectors of adjacent sides respectively 8 feet and 9 feet; find the two sides and the other bisector, each to one decimal place.

3. What is the cost of reaping a field of wheat, 214 yards long and 156 yards wide, at 14s. 3d. the acre?

4. Cheese is bought at 70s. the cwt., and retailed at 9d. per lb.; find the gain per cent.; and at what price must an 80 lb. chest of tea, bought at £13 6s. 8d., be retailed in order to gain at the same rate?

MR. W. ROBERTS.

5. The sides of a triangle are represented by the numbers 32.319, and 394.092, and the base by 395.415; it is required to find the bisector of the base.

6. Find the length of the diameter of a circle whose circumference is 246.36148739.

7. If the sides of a right-angled triangle are .1 and .041666, find the perpendicular from the right angle on the hypotenuse.

8. Find the area of a triangle whose sides are 47.8, 31.2, and 39.6.

MR. CONNER.

9. A sum of £1000 is levied annually on a poor-law union, valued at £50,000, being 20 per cent. below its real value; calculate the effect per cent. produced by the under-valuation on the value of a rent-charge held in the union.

10. £18,000, invested in the 3 per cents at 90 $\frac{3}{4}$, is transferred, on the stock rising to 91, to the 3 $\frac{1}{2}$ per cents. at 97 $\frac{1}{2}$; what increase of income is thereby effected?

11. The sides of a triangle being .9, 1.2, and 1.8 feet; find the segments of the perpendicular on the side 1.8.

12. The weekly receipts of a railway company are £6800 15s.; the expenses of working are £15,200 17s. 6d. per month. If the capital be £2,000,000, what is the income derivable from £10,000 in their stock?

Classics.

DEMOSTHENES.

MR. POOLE.

Translate the following passages into English prose:—

1. *Beginning*, πρῶτον μὲν τοίνυν οἱ περὶ τῆς βλάβης, κ. τ. λ.
Ending, ὅσον περ δὴ τῷ ἰδιώτῃ;

Adv. Meidian, 528.

2. *Beginning*, ἀλλὰ μὴν κακεῖνό γ' ἐπίστασθε, κ. τ. λ.
Ending, οὕτως εὖ τὴν ἱερὰν τριήρη παρεσκευάκει.

Ibid., 570.

3. *Beginning*, 'Ημεῖς, 'Αφόβητε, καὶ σὺ, Φιλόχαρες, κ. τ. λ.
Ending, οὗς αὐτοὶ κάθησθε δμωμοκότες.

De Fals. Leg., 415.

4. *Beginning*, οἱ γὰρ ταῦτα λέγοντες ἔπεισαν ὑμᾶς, κ. τ. λ.
Ending, μὰ τοὺς θεοὺς ἔγωγε οὐχ ὀρώ.

Pro Megal., 205.

5. *Beginning*, εἰ μὲν γὰρ εἴθινους ἐστὶν ἐκείνοις καὶ τὸν τῆς, κ. τ. λ.
Ending, οὐκ ἐνὶ τῶν αἰσχυρῶν αὐτῷ τούτων ἀπαλλαγῆναι;

Adv. Aristog., 790.

1. *a.* Explain the terms ὄφλων δίκη, ἐξούλης, and προστιμᾶν τῷ δημοσίῳ, in the *first* passage

b. Explain, in the *second* passage, the words τὰ σύμβολα συγχέων; and state the rule according to which μιᾶς is in the genitive.

c. What is the sense of the words, καὶ οὐδεμιᾶς κακίας ταῦτα, ἀλλ' οὐδὲ στρατηγίας γ' ἄξια? State the construction of συγγνώμη, and what part of the verb παρέντες is—in the *third* passage.

2. *a.* οὐχ ὅσα ἐδυνήθησαν ἀνακομίσασθαι προσδοκῶν εἰσπράξιν, ἀλλ' ὅσων ἑμαυτῷ συνύδειν ἀπεστερημένῳ, δίδωμι εἴκοσι μνᾶς τοῦτοις, ὅσου τὴν τριηραρχίαν ἦσαν μεμισθωκότες.

Translate this passage. What is the meaning of the last clause, and the construction of the words ὅσων and ἑμαυτῷ?

b. ἀλλὰ μὴν ὃ γε δῆμος ὁ τῶν Φωκίων οὕτω κακῶς καὶ ἔλεηνῶς διάκειται, ὥστε μὴ περὶ τοῦ κατηγορεῖν ἐκάστῳ τὰς Ἀθηναίων εὐθύνας εἶναι τὸν λόγον, ἀλλὰ δουλεύειν καὶ τεθνάναι τῷ φόβῳ Θηβαίων καὶ τοῦς Φιλίππου ξένους.

Translate; and explain the construction of εὐθύνας, and of Θηβαίους.

3. Point out the separate interests of the Greek States which favoured Philip's influence, both in Northern Greece and in the Peloponnesus.

4. Alexander evidently desired to appear the head of the Greek race. Show this from his conduct. And notice his politic treatment of the states conquered during his Eastern expedition.

5. Under what circumstances did the Achæan League arise? what was the nature of its administration? and what its early relations with Sparta?

6. Give some account of the career of Cassander.

7. Notice the approaches to democracy in the constitution of Solon. The beneficial effects of that constitution appeared in the changes required in the tribes under Cleisthenes?

8. Show that the later Heliastic courts must have been a matter of much importance to the Athenian citizens. How far did their constitution tend to secure an honest decision?

9. What was the object of the ἀνάκρισις; and what part of the legal proceedings took place at it?

10. State the functions of the Ephors at Sparta; and point out how, in consequence of them, the whole management of the state lay practically in their hands.

11. Draw a map of Asia, marking the sites of the principal cities taken by Alexander after the battle of Arbela; and the probable ones of the cities founded by him in the East.

12. *a.* What are the conditions required that the *relative* should admit of attraction?

b. The use of the *genitive absolute* in Greek is in two respects more restricted than that of the *ablative absolute* in Latin?

c. What parts of the Greek verb do not admit the use of *άν*; and why?

d. What are the *second aorists* of *σβίννυμαι*, *θρώσκω*, *τρίχω*, *βλάπτω*; and give the various forms of the principal tenses corresponding to the present *όπάω*?

CICERO—ORATIONS.

MR. MAHAFFY.

Translate the following passages into English:—

1. *Beginning*, Interim satis longo intervallo,

Ending, prætorum obtinent publicarum tabularum auctoritatem.

Or. pro Archia, c. iv.

2. *Beginning*, Centum prope annos legem Æliam et Fufiam

Ending, non interfuisti solum, verum etiam crudelissime præfuiisti.

Or. in Pisonem, a. v.

The following passage is intended to test the English style of the Candidates:—

Beginning, O excubias, tuas Cn. Planci, miseras! o flebiles vigilias! . . .

Ending, quas pro me sæpe et multum profudistis.

Or. pro Plancio, c. xlii.

1. The policy of Rome with regard to her subjects underwent a radical change during the middle of the second century B. C. This can be proved from a number of instances?

2. Discuss the career and character of Tib. Gracchus.

3. What was the political importance of the Jugurthine War?

4. Write a description of the personal character of Sulla.

5. Give some account of Roman education, as shown in the case of Cicero.

6. What great defect in Roman pleading (as contrasted with modern) does Mr. Forsyth point out? Give examples from Cicero's speeches.

7. Explain the terms *prævaricatio*, *divinatio*, *jus imaginum*, *prensare*, *senus fuit tristibus ex triente*.

MR. LONGFIELD.

Translate the following passage into Latin Prose:—

But the glory and life of Tacitus were of short duration. Transported, in the depth of winter, from the soft retirement of Campania to the foot

of Mount Caucasus, he sank under the unaccustomed hardships of a military life. The fatigues of the body were aggravated by the cares of the mind. For a while, the angry and selfish passions of the soldiers had been suspended by the enthusiasm of public virtue. They soon broke out with redoubled violence, and raged in the camp, and even in the tent, of the aged emperor. His mild and amiable character served only to inspire contempt, and he was incessantly tormented with factions which he could not assuage, and by demands which it was impossible to satisfy. Whatever flattering expectations he had conceived of reconciling the public disorders, Tacitus was soon convinced that the licentiousness of the army disdained the feeble restraint of laws, and his last hour was hastened by anguish and disappointment. It may be doubtful whether the soldiers imbued their hands in the blood of this innocent prince. It is certain that their insolence was the cause of his death. He expired at Tyana in Cappadocia, after a reign of only six months and about twenty days.—GIBBON.

Translate the following passage into Latin Hexameters :—

What does not fade? The tower that long had stood
 The crash of thunder and the warring winds,
 Shook by the slow but sure destroyer Time,
 Now hangs in doubtful ruins o'er its base,
 And flinty pyramids and walls of brass
 Descend. The Babylonian spires are sunk ;
 Achaia, Rome, and Egypt moulder down.
 Time shakes the stable tyranny of thrones,
 And tottering empires rush by their own weight.
 This huge rotundity we tread grows old,
 And all those worlds that roll around the Sun ;
 The Sun himself shall die, and ancient night
 Again involve the desolate abyss,
 Till the great Father, through the lifeless gloom,
 Extend his arm to light another world,
 And bid new planets roll by other laws.

ARMSTRONG.

Translate the following passage into Greek Prose :—

Bias, of Priene in Ionia, appears to have been the latest of the Seven Sages, since he was alive at the Persian conquest of the Ionian cities. The following are specimens of his maxims : he declared "the most unfortunate of all men to be the man who knows not how to bear misfortune;" that "a man should be slow in making up his mind, but swift in executing his decisions;" that "a man should temper his love for his friends by the reflection that they might some day become his enemies, and moderate his hatred of his enemies by the reflection that they might some day become his friends." When overtaken by a storm on a voyage with a dissolute crew, and hearing them offer up prayers for their safety, he advised them rather "to be silent, lest the gods should discover that they were at sea."—DR. WILLIAM SMITH.

Translate the following passage into Greek Tragic Trimeters :—

King Edward. Thus far our fortune keeps an upward course,
And we are graced with wreaths of victory.
But in the midst of this bright-shining day,
I spy a black, suspicious, threat'ning cloud,
That will encounter with our glorious sun,
Ere he attain his easeful western bed :
I mean, my lords, those powers that the queen
Hath rais'd in Gallia have arriv'd our coast,
And, as we hear, march on to fight with us.

Clarence. A little gale will soon disperse that cloud,
And blow it to the source from whence it came :
Thy very beams will dry those vapours up ;
For every cloud engenders not a storm.

SHAKSPEARE.

EXAMINATION FOR THE BERKELEY MEDALS.

HESIOD.—WORKS AND DAYS.

MR. LONGFIELD.

Translate the following passages, adding notes in case of any difficulty of structure, or ambiguity of meaning:—

1. *Beginning*, Ὡ Πέρση, σὺ δὲ ταῦτα τεῶ ἐνικάτθεο θυμῷ, κ. τ. λ.
Ending, οὐδ' ὅσον ἐν μαλάχῃ τε καὶ ἀσφοδέλῳ μέγ' ὄνειαρ.
27-41.
2. *Beginning*, εὐτ' ἂν δὲ πρῶτιστ' ἄροτος θνητοῖσι φανείη, κ. τ. λ.
Ending, οὕτω κ' ὁψαρότης πρωτηρότῃ ἰσοφαρίζοι.
458-90.
3. *Beginning*, καὶ τότε δὴ κεραοὶ καὶ νήκεροι ὕληκοῖται, κ. τ. λ.
Ending, ἀρμαλιῆς· μακραί γὰρ ἐπιβρόθοι εὐφρόναι εἰσί.
529-60.
4. *Beginning*, Μηδὲ δόμον ποιῶν ἀνεπίξεστον καταλείπειν, κ. τ. λ.
Ending, μωμεύειν αἰδέσθαι· θεός τοι καὶ τὰ νεμισσᾶ.
746-56.

1. Give some account of the various theories of the German critics (Twستن, Thiersch, and Goettling) as to the existing text of the "Works and Days."

2. Discuss the legitimacy of the principles of criticism on which these theories rest.

3. Mure considers that the genuineness of two passages only in the poem has been questioned on plausible grounds? What is his judgment as to these passages?

4. What arguments have been derived from a comparison of the Homeric and Hesiodic nomenclature and diction as to the relative ages of the poets?

5. Explain Mr. Grote's remark, "that the series of races imagined by the poet of the 'Works and Days' is the product of two distinct and incongruous veins of imagination."

6. What does K. O. Müller represent to be the fundamental idea which gives to this poem its genuine epical character?

7. Write notes on the etymologies of the following words:—*ἐπαλής*, *φηλήτης*, *ὕρπηξ*, *κράδῃ*, *δυσπήμελος*, *πλειών*, *ἄφηνος*, *τημοῦτος*, *εὐκηλος*.

HESIOD.

DR. INGRAM.

Translate the following passages into English, commenting on any words or phrases that seem to require explanation :—

1. *Beginning*, ὅθι Νύξ τε καὶ Ἡμέρα ἄσπον ἰοῦσαι, κ. τ. λ.
Ending, ἥ δ' ὕπνον μετὰ χερσὶ, κασίγνητον θανάτοιο.
Theog., 748–56.
2. *Beginning*, πολλὸν δὲ θ' ὑπὸ χθονὸς εὐρυοδείης, κ. τ. λ.
Ending, στρωτοῖς ἐν λεχέεσσι, κακὸν δ' ἐπὶ κῶμα καλύπτει.
Ib., 787–98.
3. *Beginning*, σός τε πατήρ καὶ ἐγώ. του μὲν φρένας ἐξέλετο Ζεὺς, κ. τ. λ.
Ending, ἦν ἄτην ὀχέων ἥ δ' οὐ παλινάγρετός ἐστιν.
Scul. Herc., 89–93.
4. *Beginning*, ἐν μίσσῳ δὲ δράκοντος ἔην φόβος οὔτι φατειός, κ. τ. λ.
Ending, ἐν δὲ Προϊώξϊς τε Παλιώξϊς τε τέτυκτο . . .
Ib., 144–154.
5. *Beginning*, πᾶν δὲ μετάφρενον εἶχε κάρη δεινοῖο πελώρου, κ. τ. λ.
Ending, Γοργείοις ἰδονεῖτο μέγας φόβος.
Ib., 223–237.
6. *Beginning*, παρ δ' Ἀχλὺς εἰστήκει ἐπισμυγερή τε καὶ αἰνή, κ. τ. λ.
Ending, δάκρυσι μυδαλέη.
Ib., 264–270.

1. Compare the characteristics of the Homeric and Hesiodic schools of poetry.

2. Discuss the question of the age and authorship of the “Theogony” and “Shield of Hercules.”

3. Point out the singular anomalies in the structure of the “Theogony.” Note, in particular, the strange character of the proem.

4. What are the principal discrepancies between Homer and Hesiod in their versions of the divine myths?

5. Explain the name “Εὐῶ.” Is any part of that work extant?

6. Write a note on the digamma, with especial reference to the Hesiodic poems.

THEOCRITUS.

MR. STACK.

Translate the following passages accurately into English :—

1. *Beginning*, τυτθὸν δ' ὕσπον ἄπωθεν ἀλιτρώτοιο γέροντος, κ. τ. λ.
Ending, οὔτι πα εἰς Ἀἶδαν γε τὸν ἐκλεαθοντα φυλαξεῖς.

i. 45–63.

2. *Beginning*, ἱὺγξ, ἔλκε τὸ τῆνον ἱμὸν ποτὶ δῶμα τὸν ἄνδρα, κ. τ. λ.
Ending, καὶ λέγ' ἐπιφθύζοισα· τα Δέλφιδος οστία μάσσω.
 ii. 32-62.
3. *Beginning*, ὠργεῖος, κήγών, καὶ ὁ Θεσσαλὸς ἱπποδιώκτας, κ. τ. λ.
Ending, παρθένος ἐξαέτις κόλπῳ ἐπιθυμησασα.
 xiv. 12-32.
4. *Beginning*, βάλλει τοι, Πολύφαμε, τὸ ποίμνιον ἃ Γαλατεία, κ. τ. λ.
Ending, πολλάκις, ὦ Πολυφαμε, τὰ μὴ καλὰ καλὰ πέφονται.
 vi. 6-19.

Write notes on the following subjects:—

1. The criteria which are to guide us in determining the authenticity of the poems of Theocritus.
2. The origin and progress of Bucolic poetry, and the position held by Theocritus in its development.
3. The dialect of Theocritus.
4. A brief account of the poetical school of Alexandria, and of the effect of the patronage of Greek literature by the Ptolemies.
5. On the special causes which led to the popularity of the Bucolic poetry at Alexandria.
6. Point out the pieces of Theocritus which you select as the chief in merit, and give critical reasons for your opinion.

Translate the following passage into Greek Verse:—

Beginning, *Me*. Cur non, Mopse, boni quoniam convenimus ambo,
Ending, Et foliis lentas intexere mollibus hastas.

VIRG., *Ecl.* v. 1-31.

Translate the following passage into Greek Heroic Verse:—

The fury heard, while on Cocytus' brink,
 Her snakes untied, sulphureous waters drink;
 But at the summons roll'd her eyes around,
 And snatch'd the starting serpents from the ground.
 Not half so swiftly shoots along the air
 The gliding lightning, or descending star.
 Through crowds of airy shades she wing'd her flight,
 And dark dominions of the silent night;
 Swift as she pass'd the flitting ghosts withdrew,
 And the pale spectres trembled at her view:
 To the iron gates of Tænarus she flies,
 There spreads her dusky pinions to the skies.
 The day beheld, and sickening at the sight,
 Veil'd her fair glories in the shades of night.

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Affrighted Atlas, on the distant shore,
 Trembled, and shook the heavens and gods he bore.
 Now from beneath Malea's airy height
 Aloft she sprung, and steer'd to Thebes her flight ;
 With eager speed the well-known journey took,
 Nor here regrets the hell she late forsook.
 A hundred snakes her gloomy visage shade,
 A hundred serpents guard her horrid head,
 In her sunk eyeballs dreadful meteors glow :
 Such rays from Phœbe's bloody circle flow,
 When, labouring with strong charms, she shoots from high
 A fiery gleam, and reddens all the sky.
 Blood stain'd her cheeks, and from her mouth there came
 Blue steaming poisons, and a length of flame ;
 From every blast of her contagious breath
 Famine and drought proceed, and plagues, and death.
 A robe obscene was o'er her shoulders thrown,
 A dress by fates and furies worn alone.
 She toss'd her meagre arms ; her better hand
 In waving circles whirl'd a funeral brand :
 A serpent from her left was seen to rear
 His flaming crest, and lash the yielding air.

POPE.

EXAMINATION FOR DEGREES IN MEDICINE.

ANATOMY AND PHYSIOLOGY.

PROFESSOR M'DOWEL.

1. Describe the arrangement of the pia mater in the interior of the brain.
2. Describe the pia mater of the spinal cord, and contrast it with that covering the brain.
3. Enumerate the principal ganglionic centres of the encephalon.
4. Describe the interior of the right auricle of the heart, and the relative position of the different objects seen on opening it.
5. Describe the coats of the stomach.
6. The chemical phenomena of respiration.
7. The composition of the pancreatic fluid, and the views held as to its influence in digestion.
8. Enumerate the muscles which connect the scapula to the trunk.
9. The relative anatomy of the brachial artery.
10. Give the bony boundaries of the orbit.

PRACTICE OF MEDICINE.

DR. BANKS.

1. What are the diseases in the course of which pericarditis most frequently occurs?
2. Give the characters which distinguish exocardial from endocardial sounds.
3. What are the rules which should guide us in the treatment of cardiac inflammations?
4. What is the state of the lung which is sometimes found in fatal bronchitis, which has been mistaken for lobular pneumonia?
5. When this condition of lung exists, how does it influence other parts of the lungs?
6. How does the urine in pneumonia differ from the urine in health?
7. What relation is there between the amount of urea in the urine of pneumonia and the temperature of the body?
8. At what age does the mortality of phthisis reach its maximum?
9. What are the symptoms of strumous dyspepsia?
10. How would you treat phthisis in its earliest stage?

CHEMISTRY.

DR. APJOHN.

1. If a person standing on an insulating stool in the vicinity of the positive conductor of an electric machine in action be touched for an instant by one standing on the ground, what, after such contact, will be the electric condition of the former?
2. Explain any method with which you are acquainted for determining the hygrometric condition of the atmosphere.
3. What are the experiments which would enable you to assign the amount of the following matters in a specimen of urine, viz. :—Mucus, lithic, phosphoric, and sulphuric acids, chlorine, and urea?
4. How is the “acidum phosphoricum dilutum” of the British Pharmacopœia made; and what amount of absolute phosphoric acid exists in six drachms of the dilute acid? State also how you would test it for metaphosphoric, and for nitric acid.
5. What is the formula of Rochelle salt; how is it made; and what is the nature of the precipitate which forms when a solution of it is acidulated with muriatic acid?
6. What is the chemical constitution of “acidum sulphuricum aromaticum”; and why is its saturating power less than that of the sulphuric acid employed in the preparation of it?
7. Write the formula of nitrite of soda; explain the method of making it, and how it may be distinguished from nitrate of soda. Specify also the reaction which takes place upon boiling a mixed solution of nitrite of soda and sal-ammoniac.

8. How from silver coin may fine silver be prepared? Explain also how the latter is converted into nitrate, and how from this salt oxide of silver may be separated.

9. Give the processes for preparing "liquor antimonii terchloridi;" for converting this into pure oxide of antimony, and the latter into tartar emetic.

10. What is the process for making "liquor ammoniæ fortior;" and how would you test it for carbonic acid, and for chlorine?

MATERIA MEDICA.

DR. AQUILLA SMITH.

1. Name at least three of the tinctures in the Pharmacopœia which become turbid when mixed with water.

2. By what character is "Oleum Anisi" distinguished from the other essential oils in the Pharmacopœia?

3. How is "Liquor Sodæ Arseniatis" prepared?

4. Describe the mode of growth of "Colchicum autumnale," and name the preparations of Colchicum in the Pharmacopœia.

5. What is the most important difference in the composition of "Extractum Colocynthis compositum" and "Pilula Colocynthis composita"?

6. How is prepared gelatine to be distinguished from isinglass?

7. What is Kamela? Give its characters, therapeutic action, dose, and mode of administration?

8. Give the process for preparing "Acidum Citricum" from lemon-juice.

9. Give the formula for "Confectio Terebinthinæ," and explain the principle on which it is constructed.

10. Prescribe an eight-ounce mixture for a simple diarrhœa; the prescription not to contain chalk or opium, and to be written without any abbreviation.

BOTANY.

DR. HARVEY.

1. State the origin, structure, and mode of development of the root in Exogens.

2. What happens in autumn to plants with *definite* and *indefinite* branches, respectively?

3. In what parts of an Exogen should you expect to find the most highly organized sap?

4. Distinguish between a *pinnately-trifoliolate* and a *digitately-trifoliolate* leaf.

5. How are *Ranunculaceæ* and *Rosaceæ* distinguishable by a floral character?
6. Explain the inflorescence of a Daisy.
7. State the characters peculiar to the *anthers* and to the *ovary* in *Vio-
laceæ*.
8. Distinguish *Melanthaceæ* from *Liliaceæ*.
9. Name and describe in correct botanical terms the plant marked No. 1,—giving the several characters of its stem; leaves, their *arrangement*, *stipulation*, *composition*, *form*, *cutting of margin*, *surface* (whether glabrous, hairy, scabrous, tomentose, &c.), *venation*; inflorescence; bractæ; flower, its calyx, corolla, insertion of stamens; ovary, style, stigma.
10. Name, and describe similarly, No. 2.

EXAMINATION FOR DEGREES IN SURGERY.

DR. ADAMS.

1. What operation would you resort to, to remedy the evils attending on a phimosis?
2. Give your opinion of the relative merits of the two operations which have been recommended in such a case, viz., that by simple incision, and that by circumcision.
3. Suppose you were about to subject a patient labouring under a recent syphilitic affection to a course of mercury, what examination should you make of your patient *before* he commences the use of mercury?
4. What is the nature of the cutaneous eruption called “*erythema mercuriale*”?—and give the names of the writers who signalled this effect of mercury.
5. The symptoms and synonyms of *erythema mercuriale*?
6. The circumstances under which you have seen acute inflammation of the tongue occur?
7. What symptoms of glossitis would you consider dangerous demanding active surgical interference?
8. Suppose a case of fracture of the fibula near the ankle, with the displacement forwards of the tibia on the instep, what are the characteristic appearances presented?
9. If several days have passed since the accident, and inflammation of the several tissues implicated has set in, which would you consider the more prudent course,—to wait with a view to use means to lessen the inflammatory action,—or to proceed at once to reduce the bones?
10. The mode of removing the deformity, and the proper appliances to be used to keep the bones in their place?

ANATOMY AND PHYSIOLOGY.

PROFESSOR M'DOWEL.

1. Describe the derivative lachrymal apparatus.
 2. Describe the oblique muscles of the eyeball ; mention their actions, and nervous supply.
 3. Enumerate the extrinsic muscles of the tongue, and their relative positions.
 4. Mention the arteries which form an anastomosis around the scapula.
 5. The composition of the Bile.
 6. The relative anatomy of the femoral artery in Hunter's canal.
 7. The chemical composition of Bone.
 8. Contrast the microscopic characters of the ultimate fibre of voluntary and involuntary muscles.
 9. Give a description of the psoas muscle.
 10. Describe the ligamentous connexions of the lower end of the fibula.
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SURGERY.

DR. R. W. SMITH.

1. Mention the causes and treatment of inflammation of the neck of the bladder.
 2. Sir B. Brodie's prescription in cases of lithic acid deposits in the urine.
 3. Mention the varieties of abscess occurring in the parotid space.
 4. Enumerate the situations in which fœtid abscesses are met with.
 5. Describe the disease termed "contraction of the palmar fascia."
 6. Describe the phenomena of respiration in cases of fracture of the spine in the lower part of the cervical region.
 7. Mention the causes and treatment of "pruritus ani."
 8. Give the modes of treating fissures of the anus.
 9. Enumerate the symptoms of stricture of the rectum.
 10. Treatment of the oxalate of lime diathesis.
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BIBLICAL GREEK PRIZE EXAMINATION.

PROFESSOR SIDNEY SMITH.

Acts of the Apostles.

(A.)

1. Can it be determined from internal evidence alone what are the limits of the time to which the history of the Acts belongs, and what the nature of the government of Judæa was then?

2. At what places in the Acts of the Apostles would you insert the times of writing the Epistles to the Thessalonians, and Corinthians, and Romans,—giving the reasons?

3. Specify the occasions when (reasoning from the use of the first person) Luke first joined Paul; when they subsequently separated; when they became permanently companions.

4. Silas cannot be identified with Luke?

5. Enumerate the five visits of Paul to Jerusalem, and say which of them is to be identified with that referred to in Gal. ii., giving some of the reasons.

6. *ἔσεσθέ μοι μάρτυρες ἐν τε Ἱερουσαλὴμ καὶ ἐν πάσῃ τῇ Ἰουδαίᾳ καὶ Σαμαρείᾳ καὶ ἕως ἐσχάτου τῆς γῆς.* Point out how the plan of the Acts of the Apostles answers to that indicated in these words.

7. Philip who was sent to the Eunuch is the same as he who had four daughters prophetesses, and neither of them was an apostle; how is this shown?

8. *πολλοὶ τῶν ἐχόντων πνεύματα ἀκάθαρτα βοῶντα φωνῇ μεγάλῃ ἐξήρχοντο.* Explain the construction.

9. What was the inscription found in the Tiber in the sixteenth century, apparently corroborating the account of Simon in Justin Martyr?

10. What is the real meaning of "Semoni," and of the whole inscription?

11. Paul is said to have continued his work in the school of Tyrannus for two years: what ground is there for thinking that during this stay at Ephesus he paid an unrecorded visit to Corinth?

12. How are Paley's objections to this opinion disposed of by C. and H.?

13. II. Cor. i. 15, 16. "In this confidence I was minded to come to you before, that ye might have a second benefit: and to pass by you into Macedonia, and to come again out of Macedonia to you, and of you to be brought on my way unto Judea." Explain the seeming difficulty arising from this passage.

14. What Epistle was written at the close of this stay at Ephesus? and on what grounds is this concluded?

15. Who were the ten persons who were with Paul during his first imprisonment at Rome? Mention the Epistles from whose salutations this is concluded?

16. What reasons to show that of these ten only Luke could have been the writer of the Acts?

17. *κατ' ἐκείνον δὲ τὸν καιρὸν ἐπέβαλεν Ἡρῶδης ὁ βασιλεὺς τὰς χεῖρας κακῶσαι τινὰς τῶν ἀπὸ τῆς ἐκκλησίας.* What Herod was this? Point out the undesigned accuracy detected here by Paley?

18. Paul says in II. Cor., "When I came to Troas to preach Christ's Gospel, and a door was opened unto me of the Lord," &c. To what portion of the narrative in the Acts is this to be referred?

19. Why did Paul not then remain at Troas to preach?

20. Where after this did Titus meet him?

21. Give the chief particulars concerning Titus that can be collected from the Epistles.

22. Paul's citizenship was not derived from his being a citizen of Tarsus: the reason being that it was not a "Colonia," nor a "Municipium," but only an "urbs libera." Explain the force of this reasoning, and the meaning of these different terms.

23. *Ἀνέστησαν δὲ τινες τῶν ἐκ τῆς συναγωγῆς τῆς λεγομένης Λιβερτίνων καὶ Κυρηναίων καὶ Ἀλεξανδρίων, κ. τ. λ.* These synagogues have been differently classified; mention the three chief modes.

24. By what change of translation does Wieseler support his idea that Paul's father was a *Cilician Libertinus*?

25. Give the view of Chrysostom.

26. "They watched the gates day and night to kill him (Saul)." In II. Cor. it is said in reference to this, *ὁ ἐθνάρχης Ἀρέτα τοῦ βασιλέως ἐφρούρει τὴν πόλιν.* In what sense is *ἐθνάρχης* used here, and what different senses is it capable of?

27. State the chronological difficulty as to Damascus being then subject to Aretas.

28. And the supposition by which Wieseler proposes to remove it.

29. Write a note saying who Aretas was, the cause of his war with Antipas, why the expedition of Vitellius was abandoned, and what was the fate of Antipas?

30. Describe exactly the office of the Asiarchs; and state the source from which we derive information concerning them and similar officers.

31. "Having caught Gaius and Aristarchus, men of Macedonia." What two other persons of the name Gaius are mentioned?

32. Explain *νεωκóρος*. How is the word applied by Josephus? Does it mean "sweeper"? Explain the inscription on Hadrian's coin—*Ἐφεσίων δις νεωκóρων*.

33. *προσλαβόμενοι τῶν ἀγοραίων τινὰς ἀνδρας πονηροὺς—ἀγόραιοι ἀγονται καὶ ἀνθύπατοι εἰσιν.* What are the different meanings assigned to *ἀγοραῖος*, according to its accents? and on what authority?

34. What were the Greek words for Proprætor, Proconsul, Procurator?

35. What distinction in these different offices, and the powers intrusted to them? and what is their historical origin?

36. Give examples of each from the N. T.

37. There is a remarkable historical accuracy in what is said of Sergius Paulus, the deputy of Cyprus, as derived from the statements of Dio Cassius?

38. ἀνθύπατοι. Can the plural here be accounted for?

39. On what occasion was it, probably, that Paul went to Illyricum?

40. "All the prophets from Samuel, and those that follow after, as many as have spoken," &c. State the various constructions of the Greek. Why is Samuel placed first here?

41. Explain the origin of a "Sabbath day's journey"?

42. Derive, and explain the etymology of ὑπερῶν, and state what other Greek word of the same meaning is used by S. Luke.

43. Opinions differ as to who were οἱ ἐκ γένους Ἀρχιερατικοῦ? "A Levite—having land." What is the difficulty, and how is it removed by Scripture evidence?

44. Mention the five different occasions on which we find in the Acts the "imposition of hands."

45. Lechler differs from Neander as to the reason why the Samaritans had not received the Holy Ghost until Peter and John arrived?

46. Lechler refers to two passages to show that the imposition of hands was not confined to the Apostles, nor the exclusive vehicle of the communication of the Spirit?

47. "Thou hast neither part nor lot in this matter." He renders this differently from either Neander or Lange?

48. διακονεῖν τραπέζαις. Explain the meaning. How does E. V. render the noun in the parable of the pounds in S. Luke's Gospel?

49. "A great sheet knit at the four corners, and let down to the earth." Correct this translation, and mention the various readings.

50. Translate the passage from Diodorus Siculus by which the words in Acts are illustrated: εἶθ' ἐνὶ τῶν ἐμπαγόντων ἐνάπτοντες ἀρχὰς στυπίνης ἀφ' ἧς μέχρις αὐτοῦ παραλύθη.

51. τὴν ἐκκλησίαν τοῦ Θεοῦ ἣν περιποιήσατο διὰ τοῦ αἵματος τοῦ ἰδίου. What reason (rejected by Alford) is given by Meyer for the reading of the *textus receptus* here, τοῦ ἰδίου αἵματος?

52. The structure imagined possible by Meyer would be contrary to the *usus loquendi* of the N. T. Greek?

53. τοῦ Θεοῦ. Does any doubt remain as to the reading in B? What is the evidence of it?

54. From what passage has it been argued that the name of the Holy Ghost was used in the baptismal formula?

55. πᾶς οἶκος Ἰσραὴλ. Show that it is not necessary to regard this as an exception to the rule relating to πᾶς with an anarthrous noun?

56. ἦσαν δὲ οἱ πάντες ἄνδρες ὡσεὶ δεκάδυο. Give the exact rendering, and adduce some parallels.

57. "Have ye received the Holy Ghost since ye believed?" This translation is incorrect with respect to both verbs?

58. Mention some of the Cilicisms ascribed to S. Paul.

59. Give a list of the Latin words in Acts.

60. What were the *ἑφέσια γράμματα*? How many were they originally?

61. Explain *περιεργα*. Where else in the N. T. does the word occur?

62. What references in S. Paul's Epistles to such practices?

63. Meaning of *ἐξορκίζω*. Where is the word found in the N. T.?

64. Mention some of the occasions on which the burning of magical books is recorded by Latin historians.

65. "The sure mercies of David." Explain how the Greek word here came to be translated "mercies."

66. "David, after he had served his own generation by the will of God." Give the Greek, and the rendering by C. and H.

67. The E. V. may be supported as to the words, *τῇ τοῦ Θεοῦ βουλῇ*, by a parallel from the Acts?

68. *εἰς τὸ μεταξὺ σάββατον*. What authority is there for giving *μεταξὺ* a different meaning here from what it has in all other places in the N. T.?

69. *ἀγνίσθητι συν αὐτοῖς καὶ δαπάνησον ἐπ' αὐτοῖς*. Write a note on these words. What was *ἡ προσφορά*?

70. If Paul is properly described as *φύλασσω τὸν νόμον*, how is this reconciled with the language used in Galatians, *διὰ νόμου νόμῳ ἀπέθανον*?

71. In the apology before the Jews delivered before Lysias, there are numerous Hebraisms—point out some of them; and also the expressions peculiar to S. Luke.

72. The Chiliarch having first bound Paul, *τῇ ἐπαύριον ἔλυσεν αὐτὸν*, (Acts, xxii.) and (xxiii.), we find him bound again, *ὁ δέσμιος Παῦλος*. These circumstances may be explained and reconciled in a way different from Alford's?

73. *οὐκ ᾔδειν ὅτι ἐστὶν ἀρχιερεὺς*. Give the various solutions of the difficulty.

74. "Having more perfect knowledge of that way, he deferred them." State the different views of this passage.

75. "Of whom I have no certain thing to write unto my lord." What light is thrown by history on the phraseology here?

76. What does Josephus tell us of Judas the Galilean? Explain his statement that Judas was the founder of the fourth sect among the Jews.

77. Give some account of Gamaliel.

78. What does Josephus say concerning "that Egyptian"?

79. *κατηχημένος τὴν ὁδὸν τοῦ Κυρίου*. Write a note explaining the origin and growth of this phrase.

80. What particulars about Apollos may be gathered from the Epistles?

81. ἐν ὀλίγῳ με πείθεις Χριστιανὸν γενέσθαι. Give Alford's argument for his rendering.

82. With what limitations as to mood and tense are verbs used "de conatu"?

83. Is there any example of ἐν ὀλίγῳ in the sense of our translation, or any example of the occurrence of it elsewhere in the N. T.?

84. χρηματίζειν Χριστιανοῦς. Give examples from the N. T. (1) of the verb used in the same sense, and (2) of its use in a different sense, (3) of its use in classical authors and the LXX. in a third sense.

85. Give some account of Felix. Why called "Trium reginarum maritus" by Suetonius? What does Tacitus say of him?

86. Show that Paul's persecutions (except on two occasions) arose from the part he took in the controversy about the Jewish ceremonial law. What are the two exceptions?

87. What was the nature of the office of the Captain of the Temple, and what notice of it in the O. T.?

88. οἱ γὰρ κατοικοῦντες ἐν Ἱερουσαλὴμ καὶ οἱ ἄρχοντες αὐτῶν τοῦτον ἀγνοήσαντες καὶ τὰς φωνὰς τῶν προφητῶν τὰς κατὰ πᾶν σάββατον ἀναγινωσκομένας κρίναντες ἐπλήρωσαν. What is the E. V.? Alford's objections to it, and his own construction?

89. What was the order of the synagogue service? and what notice can be found in the Acts of its several divisions?

90. The letter from the Council of Jerusalem begins thus (E. V.): "The apostles and elders and brethren," &c. What various reading exists? How is it shown to be ancient?—why is it said to have arisen from hierarchical considerations?—and how is the passage then to be translated?

91. "We have sent Judas and Silas, who shall also tell you the same things by mouth." Give the Greek. To what does "the same things" relate? Neander, in referring the words to what follows, reasons from ἀπαγγέλλω and not καταγγέλλω being used. Explain his meaning.

92. Mention the chief words and phrases peculiar to S. Paul occurring in his address to the Ephesian elders.

93. Did Paul disobey the Holy Spirit when the Tyrian prophets, ἐλεγον διὰ τοῦ πνεύματος μὴ ἐπιβαίνειν εἰς Ἱεροσόλυμα?

94. ὅτε δὲ ἐγένετο ἔξαρτίσαι ἡμᾶς τὰς ἡμέρας. What objection to Meyer's rendering of the words?

95. Write the Greek of the passage as it ought to be if either an action continued or an action terminated were intended.

96. To those who found an argument for celibacy from what is said of Philip's daughters, it has been replied—ὥστε οὖν καὶ τῷ κοινωνήσαντι γάμῳ διακοινῶν ἐξέστι. Explain the argument, and state the question on the solution of which depends the conclusion whether or not it be a sound argument.

97. "Go toward the south, unto the way that goeth down from Jerusalem to Gaza, which is desert." Some have derived an intimation of the date of the Acts of the Apostles, by what reasoning? Prove the correct structure (which does not countenance this).

98. What event in the Acts is that whose date is most certainly fixed ?

99. Is there anything to indicate whether or not the Eunuch was reading the original passage of Isaiah ? Explain the passage.

(B.)

100. Who was the father of Sopater of Berea ?

101. The evidence as to the genuineness of the Eunuch's confession of faith is thus given by Alford :—"rec inserts (the verse) with (E) all Bed-gr v (not am) arm ar-pol slav-mss syr* Iren (gr and lat) Oec Thl² (text) Cyp Jer Aug Prædest Pacian : om ABCGH all am copt sah Syr syr* æth Chr₂ Oec (ms) Thl' Bed." Write a note developing the meaning of these various contractions (the different uncials especially).

102. "Why hath Satan filled thine heart," *ψεύσασθαι σε τὸ πνεῦμα τὸ ἅγιον—οὐκ ἐψεύσω ἀνθρώποις ἀλλὰ τῷ Θεῷ*. Explain the significance of the different cases governed here by the same verb.

103. *οὐδ' δεῖ ἐπὶ σοῦ παρῆναι καὶ κατηγορεῖν εἰ τι ἔχοιεν πρὸς ἐμέ*. Explain the optative here.

104. *ὅτι οὗτός ἐστιν ὁ Χριστὸς Ἰησοῦς ὃν ἐγὼ καταγγέλλω ὑμῖν*. Give the rendering of E. V. and of Alford.

105. Give the exact force of the prepositions in the following :—

- a. *Φίλιππος εὐρέθη εἰς Ἀζωτον*.
- b. *ἐπιστρέψαι ἀπὸ σκότους εἰς φῶς καὶ τῆς ἐξουσίας τοῦ σατανᾶ ἐπὶ τὸν Θεόν*. Distinguish *εἰς* and *ἐπὶ*.
- c. *τοῦτο πρὸς τῆς ὑμετέρας σωτηρίας ὑπάρχει*.
- d. *εἰς διαταγὰς ἀγγέλων*.

106. *ἀλλ' οὐδὲ εἰ πνεῦμα ἅγιόν ἐστιν ἠκούσαμεν*. Explain the structure here, and state the grammatical rule.

107. *κατηχήθησαν δὲ περὶ σοῦ ὅτι ἀποστασίαν διδάσκεις, κ. τ. λ.—γινώσκονται πάντες ὅτι ὧν κατήχηνται περὶ σοῦ οὐδὲν ἐστιν*. Correct the E. V. here as to the tenses.

108. *ὁ χιλιάρχος ἐπυνθάνετο τίς ἂν εἴη καὶ τί ἐστι πεποιηκώς*. Explain the difference of force of the optative *εἴη* and the indicative *ἐστι*.

109. *εἰ ἂν ᾗ ἐξ ἀνθρώπων ἡ βουλή αὕτη, καταλυθήσεται· εἰ δὲ ἐκ Θεοῦ ἐστιν, οὐ δύνασθε καταλῦσαι*. Distinguish the force of these two forms of hypothetical propositions.

110. How should the first of them be framed in Greek in order to signify "If this counsel had been of men, it would have come to nought" ?

111. Give the four forms by which one can express in Greek—possibility, objective uncertainty, subjective uncertainty, impossibility.

112. *οὐδ' δεῖ ἐπὶ σοῦ παρῆναι—εἰ τι ἔχοιεν πρὸς ἐμέ*. Why not *ἔχουσι* ?

113. How is the structure irregular ? What would be the meaning if it were regular ?

114. τῶν δὲ στρατιωτῶν βουλή ἐγένετο ἵνα τοὺς δεσμώτας ἀποκτείνωσιν μήτις ἐκκολυμβήσας διαφύγῃ. The rec. reads διαφύγοι. Why due to a grammatical emendation? Explain the subjunctives here.

115. ἐτοιμάσατε στρατιώτας διακοσίους. How would the meaning change if the verb were ἐτοιμᾷτε?

116. καταφερόμενος ὕπνῳ βαθεῖ—κατενεχθεὶς ἀπὸ τοῦ ὕπνου ἐπείσεν ἀπὸ τοῦ τριστέγου κάτω. Give the force of the participles here.

117. ἐπιστροφάντες δὴ ἐπισκεψώμεθα τοὺς ἀδελφοὺς. Translate, and give the force of δὴ.

118. ὅπως ἂν ἔλθωσιν καιροὶ ἀναψύξεως ἀπὸ προσώπου τοῦ Κυρίου. Translate, and explain the sense. State the peculiar Hebrew idiom in the word προσώπου.

119. ἦν ἡμέρας τρεῖς μὴ βλέπων καὶ οὐκ ἔφαγεν οὐδὲ ἐπιεν. Distinguish the force of the negative particles.

120. μέλλοντι πλεῖν τοὺς κατὰ τὴν Ἀσίαν τύπους—ἀναφανέντες τὴν Κυπρον. When, and in what sense, are verbs neuter and verbs passive followed by the accusative?

121. συνθρύπτοντες. Alford says, "The present participle does not imply the *endeavour* merely, here or anywhere else." What is the grammatical principle referred to?

122. οὐ παράδεχονται σου τὴν μαρτυρίαν περὶ ἐμοῦ. State the grammatical reasoning as to the structure of this passage.

123. Give some account of ἡ σόα ἡ καλουμένη Σολομῶντος—ἡ θύρα τοῦ ἱεροῦ ἡ λεγομένη Ὁραία—οἱ ἀναβάθμοι—ἡ παρεμβόλη; and the positions of these several places with respect to the Temple?

124. What was Βάρις?

125. Give the positions of Adramyttium, Mitylene, Cnidus, Attalia, Cenchrea, Rhegium, Tarsus.

126. Why was Tarsus sometimes called by a plural name, Τάρσοι? What was its etymology?

127. Distinguish the two places called "Cæsarea:" state where they were, and where each is mentioned in the N. T.

128. What were the ancient names of each town?

129. τῷ Ἀδρίᾳ. What is the evidence as to the geographical boundaries of this sea?

130. What was the full name of the chief town of Troas, and by whom given to it?

131. Trace S. Paul's route from Ephesus to Greece, and thence to Jerusalem.

132. Give some account of the places whose modern names are St. Jean d'Acre, Stanchio, Said.

133. What was the ancient name of Philippi? On what river was it?

134. "Which is the chief city of that part of Macedonia, and a colony." Correct the translation, and explain the passage. What was the chief city of Macedonia?

135. "Hearing a voice, but seeing no man." Compare the different accounts as to these words, and give the modes proposed for reconciling them.

136. εἰστήκεισαν ἐνεοί. Write a note on each word.

137. a. γράφας ἐπιστολὴν περιέχουσιν τὸν τύπον τοῦτον.

b. ἑκατοντάρχης ἐκ σπειρῆς τῆς καλουμένης Ἰταλικῆς.

c. ἀπο τετάρτης ἡμέρας μέχρι ταύτης τῆς ὥρας ἤμην νηστεύων.

Translate, and explain by notes, the above passages.

138. "Ye took up the tabernacle of Moloch, and the star of your god Remphan." What is the passage in Amos? How does Hody explain "Remphan" so as to bring it into accordance with the Alexandrian word used in the LXX.?

139. Correct E. V. of the following, giving the reasons for the corrections:—

a. "Finding disciples, we tarried there seven days."

b. "When we had gotten from them."

c. "Art not thou that Egyptian?"

d. "That Christ should suffer."

e. "I have showed you all things, how that so labouring ye ought to support the weak."

f. "Philip the evangelist, which was one of the seven."

g. "We took up our carriages." (Here state the reading of the *textus receptus*, and of Alford, and the meaning of each.)

140. Give the words of the text in E. V. in which "carriage" occurs in the same sense as in Acts, xxi.

141. φαντασία—συναλιζόμενος—ἀποκαθιστάνεις—κοπετόν—πειροχή—ἐξουθενίω—ἐλάκησε—ἀφελότητι—δεξιολάβους—δμοθυμαδόν—συνέκδημος—χαλᾶν—λαβεῖν τὸ ἱκανόν—ἀλίσγημα. Explain briefly these words.

142. Distinguish κατοικεῖν and παροικεῖν; ἐξίσταντο and διηπόρουν; κτήματα and ὑπάρξεις.

143. Ταβιθά, Γάζη, Ἐλύμας, Ἀκελδαμὰ, σιμικίνθιον. Give the original meaning of each word, and the language from which it comes.

144. What division of Stephen's discourse has been derived from the heads of the accusation against him?

145. Write notes on the following passages in this discourse:—

a. ἐν ψυχᾷς ἐβδομηκονταπέντε.

b. πρὶν ἢ κατοικῆσαι αὐτὸν ἐν Χαρρᾶν.

c. εἰς διαταγὰς ἀγγέλων.

d. μὴ στήσης αὐτοῖς ταύτην τὴν ἀμαρτίαν.

e. νῦν δεῦρο ἀποστείλω σε εἰς Αἴγυπτον—τοῦτον ὁ Θεὸς ἄρχοντα καὶ λυτρωτὴν ἀπέσταλκεν (explaining the tenses).

f. ἐξήγαγεν αὐτοὺς ποιήσας τέρατα (correct E. V.).

g. πάροις ἐν γῇ Μαδιὰμ.

h. σκηνή τοῦ μαρτυρίου.

i. "Which also our fathers that came after brought in with Jesus into the possession of the Gentiles" (giving the Greek).

146. "When sailing was now dangerous, because the fast was now already past." Correct E. V. here. What was the fast, and the date of it?

147. Explain *κατὰ λίβα καὶ κατὰ χῶρον*.

148. a. ἄραντες ἄσσον παρελέγοντο τὴν Κρήτην.

b. "But not long after there arose against it a tempestuous wind called Euroclydon."

c. "We let her drive."

d. "They strake sail, and so were driven."

e. "When they had taken up the anchors, they committed themselves unto the sea."

Write explanatory notes on these passages, correcting the E. V. when necessary.

149. a. Rom. xv. 25. "But now I go to Jerusalem to minister to the saints: for it hath pleased them of Macedonia and Achaia to make a certain collection for the poor saints which are at Jerusalem."

b. II. Cor. i. 8. "For we would not, brethren, have you ignorant of our trouble which came upon us in Asia, that we were pressed out of measure, above strength, insomuch that we despaired even of life."

c. II. Thess. iii. 1, 2. "Wherefore when we could no longer forbear, we thought it good to be left at Athens alone; and sent Timothy, our brother, and minister of God and our fellow-labourer in the Gospel of Christ, to establish you, and to comfort you concerning your faith."

d. I. Tim. i. 3. "As I besought thee to abide still at Ephesus, when I went into Macedonia, that thou mightest charge some that they teach no other doctrine."

Illustrate these passages from the Acts of the Apostles. Give a general view of Paley's argument in connexion with them.

150. Σαοὺλ Σαοὺλ τί με διώκεις. A remarkable undesigned coincidence has been noticed here?

151. What passages in one of the Epistles are referred by Eusebius to a period subsequent to the conclusion of the Acts of the Apostles?

WRAY PRIZE EXAMINATION.

 DR. MALET.

1. State *fully* what seems to you to be Locke's opinion of a natural division of substances into species; also his arguments.
2. With regard to the credibility of Miracles, Locke anticipates one argument of Butler's? What inference, also, does he make from the degree of apparent deviation they may have from the general laws of Nature?
3. Locke, according to Whately, misunderstands the true nature of the Science of Logic; his mistake partly arises from the confusion of a certain word. What two instances does he select from Locke, and how does he illustrate their absurdity?
4. State the several steps, *seriatim*, by which Butler vindicates from objections the "Particular System" of Christianity; and from what proposition does he necessarily start in his investigation?
5. How, particularly, does he answer objections to the vicarious punishment of Christ? Such objections, he says, conclude against the "whole notion of Religion;" how do they so? They would also overthrow the argument based on the Natural Tendency of this Method of Redemption; how so?
6. He insinuates in what sense vicarious punishments may be necessary in connexion with God's scheme of Moral Government?
7. How does Butler use the argument from a phenomenon to a cause in the following questions?—(a) A future life. (b) The existence of an original revelation. (c) The Miracles of Christianity. (d) The evidence of Christianity; or any other cases that may occur to you. What is the exact force of such an argument? and what particular fallacy may it be used to answer, according to Whately?
8. The objection to the supposed doubtfulness of the evidence is put in the form of an analogous case; how does Butler answer it?
9. The snares and temptations of Vice render this world *peculiarly* fit to improve us in Virtue; how so, precisely? What false theory of Virtue might be fallaciously said to follow from Butler's assertion? Where lies the fallacy, and how does he expose it? His views coincide with another celebrated theory of Virtue?
10. What *fact* shows that Virtue and Piety are necessary qualifications for a future state of happiness? With regard to *Piety*, what seeming difficulty exists, and how does he remove it?

 LOGICS.

DR. WEBB.

1. How does the Ego posit itself, according to Fichte? Give Cousin's criticism on this doctrine. Show that the Absolute Ego of Fichte is a contradiction.

2. Stewart mentions various anticipations of the principles of Kant which are to be found in previous writers?

3. "Si concedatur Principia Scientiarum ex Inductione quâ utuntur, vel Sensu vel Experientiâ, recte posse constitui, certissimum est tamen Axiomata inferiora ab iis per Syllogismum non posse in rebus naturalibus quæ participant ex materiâ, recte et tuto deduci." Explain and comment upon this assertion.

4. What is the proper use of Hypothesis? How is a legitimate to be distinguished from an illegitimate Hypothesis? Some Inquiries apparently Hypothetical are really Inductive?

5. In what manner does the proof of Empirical Laws depend on the Theory of Chance? On what foundation does the Doctrine of Chances rest?

6. Give Mill's criticism on Locke's Theory of Knowledge.

7. State Hume's Doctrine of Miracles, and show how far it may be properly admitted.

SUPPLEMENTAL DIVINITY EXAMINATION.

JUNIOR CLASS.

PROFESSOR'S LECTURES.

1. Distinguish between the terms Rationalism and Naturalism.

2. What element of the Theistic argument cannot be reached by a *posteriori* considerations?

3. What do the expressions, the *Absolute*, the *Infinite*, practically signify?

4. What is the standing formula of Pantheism?

5. How can we rise to the idea of the Divine Personality?

6. By what illustration does Leibnitz endeavour to avoid the objection to his theory of the origin of Evil?

7. How does Coleridge illustrate the fact that writers on Natural Religion borrow from Revealed?

8. What powerful *external* evidence is there for the early date of the Apocalypse?

9. What system of unbelief is overturned by establishing the early date of the Books of the New Testament?

10. Explain the discrepancies in the numerical statements of the Old Testament. Give instances.

11. Hume's argument against the conclusiveness of testimony as proof of Miracles amounts to a false syllogism?

12. The system of Rénan is built upon two distinct philosophies of unbelief; prove this.

13. A saying of our Lord reconciles the seeming opposition between the prophetic representations of the Messiah?
14. What is the combined purpose of the two genealogies of our Lord?
15. Distinguish the evolution of doctrine from the theory of Development?
16. What is Sir James Stephen's objection to the Scriptural proof of the eternity of future punishments?
17. Dr. Wallis's explanation of the doctrine of the Trinity amounts to Sabellianism?
18. Show that the denial of the title *Θεοτόκος* amounts to Nestorianism, and why?
19. How does Mr. Jowett misstate the view of the Fathers as to the Atonement?
20. What term did S. Anselm introduce as explanatory of the Atonement? In what sense did he employ it?

MAGEE ON THE ATONEMENT.

1. State Magee's explanation of the acceptance of the Sacrifice of Abel.
2. Write a brief note on this explanation.
3. His exposition of Gen. iv. 7 ("sin lieth at the door") is open to criticism?
4. State Warburton's theory as to the origin of Sacrifice.
5. What were the theories of Spencer and Outram?
6. What is Magee's opinion as to the nature of the Passover?
7. What as to the Burnt-Offering?
8. What is the view of Sykes as to the Burnt-Offering and Sin-Offering?
9. What is the objection of Sykes and others as to the doctrine of the vicarious import of the Mosaic Sacrifices?
10. Is Archbishop Magee's reply quite satisfactory?

COMPOSITION.

"Who shall separate us from the love of Christ?" Rom. viii. 35.

Trinity Term.

ECCLESIASTICAL HISTORY PRIZE EXAMINATION.

THE PROFESSOR OF ECCLESIASTICAL HISTORY.

S. CLEMENTIS ROM. *Epist.* i.

1. (a.) When, and where, was this Clementine Epistle first printed?
(b.) State the circumstances connected with its publication.
2. Three principal opinions as to the date of this Epistle?
3. On what words of S. Clement does Grabe found an argument, that this Epistle must have been written before the year 70?—Is the inference certain?
4. Earliest two writers who have said that S. Clement of Rome was a Martyr? and the years when they flourished?
5. What appears to have been the origin of the story of his Martyrdom?
6. What expressions have been used by S. Irenæus and Eusebius, respectively, to describe this Epistle of S. Clement?
7. On what ground chiefly have Wall (*Hist. of Inf. Bapt.*) and other writers discredited the statement of Eusebius and S. Jerom, that S. Clement of Rome is mentioned in S. Paul's Epistle to the Philippians?
8. Tillemont, Venema, and (on one occasion) Coustant have rashly inferred from S. Clement's words that he was a member of a Jewish family?
9. Καὶ τὰ παθήματα αὐτοῦ ἦν πρὸ ὀφθαλμῶν ὑμῶν. (ῥ. ii.)—The passage in which these words are found refutes a supposition of Photius relative to S. Clement; and recalls a very remarkable verse in the Acts of the Apostles?
10. A sentence spoken by our blessed Lord, but not recorded in the Gospels, seems to be referred to by S. Clement?
11. Various meanings have been assigned to the phrase, τὸ τέρμα τῆς δόσεως, in ῥ. v., relating to the travels of S. Paul.
(a.) State the opinions of different writers.
(b.) What country does the Muratorian Fragment favour?
(c.) Date of this Fragment?
12. In what year, according to Dr. Burton, did the Martyrdom of S. Peter and S. Paul, mentioned by S. Clement, take place?—And what writer, about the middle of the second century, speaks of the deaths of these Apostles as having occurred "at the same time?"
13. (a.) The words, μετανοίας τόπον ἔδωκεν, in ῥ. vii., evidently refer to a passage in the Epistle to the Hebrews?
(b.) Junius (Patrick Young) wished to introduce an alteration, with a view to maintain one of Calvin's doctrines?

14. How does it appear that S. Clement believed that Job lived before the time of Moses?

15. An allegorical interpretation of a verse in the Book of Joshua, (referred to by Dr. Whitby, in his *Dissert. de S. Script. interp. secund. Patrum Commentarios*), is given by S. Clement, and many other early Ecclesiastical writers?

16. What sentence in the Book of Job has been quoted by S. Clement with respect to the state of mankind since the Fall?—And how have the Ancients been enabled to adduce that passage to show the necessity of Infant Baptism?

17. Ὁκεανὸς ἀνθρώποις ἀπέραντος, καὶ οἱ μετ' αὐτὸν κόσμοι. (§. xx.)

(a.) What reference made to this passage by writers of the second century?

(b.) Authors in the third and fourth ages have cited it?

(c.) To what countries do Bp. Fell and Young make the words applicable?

(d.) Cotelier, in a note, refers to a controversy in the eighth century, in which a celebrated Irishman was concerned?

(e.) Who is said to have been styled, by a Bishop of Rome, *Alterius Orbis Papa*?

18. With regard to the Phoenix, a verse in Psalm xcii. is appealed to by Tertullian (*De Resur. Carnis*, Cap. xiii.) and other writers?

19. Θεὸν τῶν αἰώνων. (§. lv.)

(a.) Various translations of these words?

(b.) Quote a verse (and the marginal reading) from the Book of the Prophet Isaiah, in which occurs a similar expression, made use of in a well-known Hymn.

20. S. Jerom (*De Viris illust.*) tells us that, in his day, the memory of S. Clement of Rome was preserved by a certain edifice erected in that city. Has his testimony been confirmed by any recent discovery?

S. AUGUSTINUS.

21. Date of S. Augustin's birth? and that of his conversion?

22. At what period of his life did he embrace the Manichæan heresy?

23. Some particular facts should be borne in mind with regard to his descriptions of himself and his companions?

24. Name given to the *Te Deum laudamus* in the Roman Breviary? and why?

25. Who was the pupil and biographer of S. Augustin?—And what proof does he supply of the benefit conferred on the Churches of Africa by the Clerical School established by this Bp. of Hippo?

26. To what extent has S. Augustin occupied the attention of Tillemont?—And why has the latter writer been so partial to this Father?

27. Of how many years of S. Augustin's life do his Confessions furnish us with the main outlines?—And when was he consecrated Bishop of Hippo Regius?

28. Date of S. Augustin's death? and his age when he died?
29. When did Manes live? and whom did he in many respects resemble?
30. Greek and Latin writers have derived from a single document nearly all the historical facts which they have recorded concerning Manes?—This document is assigned to what year? and where is it easily to be found?
31. What is remarkable with respect to the notice taken of Manes by Eusebius?
32. According to several ancient writers, Manes had at first another name; with regard to which S. Augustin was not in error, as Bishop Pearson (*Expos. of Creed*, Art. i.) supposed?
33. What information does S. Augustin, in the ninth Book of his Confessions, give us relative to the first institution of antiphonal singing in the Western Church?
34. In what year; under whom as their leader; and by whom invited, did the Vandals invade Africa?
35. There is extant a contemporary account of the cruelty and excesses of these barbarians; and also a work, relating to their invasion, and bearing date not long after that event?
36. Modern name of Hippo Regius?—Whence the epithet of "Regius?"—When this city was burned by the Vandals, what was providentially preserved?

THE CANON LAW.

37. Into how many Præfectures was the Roman Empire divided, when Christianity obtained a legal establishment in it?—Define them.
38. How many Dioceses were there in the Roman Empire?—And when the term "Diocese" signified a great division of that Empire, what was a Bishop's sphere styled?
39. Precise meaning of the word "Council?"
40. An historical account of the Canon Law may be fitly divided into certain periods?—Distinguish them.
41. Other name of *The Code of the Primitive Church*?
42. What was called *The Code of the Universal Church*?
43. Of what Decrees did *The African Code* consist? and when was it formed?
44. Give some account of the *Codex Canonum Vetus Ecclesiæ Romanæ*.—When was it first published; and by whom?
45. Date of the commencement of a great change in the constitution of the Western Church?
46. What were "Capitulars," and "Capitular Letters?"—And by whom, and when, was the first Collection of the Capitulars made?
47. At what period was the old Canon Law of the Church completely superseded in the West?

48. Origin of the name "Bacularius" in the Schools of Law?—Difference between the "Baccalaurei Formati," and the "Baccalaurei Cursores," at Paris?

49. Into how many parts is Gratian's *Decretum* divided?—Describe them.

50. The Roman Pontiffs are said to have effected in the Church what Justinian effected in the Roman Empire?

The remainder of the Examination was conducted *viva voce*.

UNDERGRADUATE HONOR EXAMINATION PAPERS.

Trinity Term.

SENIOR SOPHISTERS.

Experimental Physics.

CHEMISTRY AND CRYSTALLOGRAPHY.

DR. APJOHN.

1. Explain the reactions which take place when iodine is brought into contact with solution of potash, solution of sulphurous acid, and solution of hyposulphite of sodium.

2. How would you determine the relative quantities of chlorine, bromine, and iodine, in a mixed solution containing these elements in combination with sodium?

3. How would you test for iodine in bromide of potassium?

4. How is the hydrated phosphorous acid best obtained? and what are the products which it yields when exposed to a low red heat?

5. What is the mode of preparing hydrocyanic acid from cyanide of mercury?—how is the acid converted into cyanide of potassium?—and what is the action of a solution of this latter salt on a mixed precipitate of carbonate of lead and carbonate of silver?

6. A phosphate, upon analysis, gave the following results:—

Phosphoric acid, . . .	28.96
Magnesia, . . .	16.32
Ammonia, . . .	6.98
Water, . . .	47.74

100.00

What is the formula of the salt?

7. When a mixture of fluor spar and silix is acted upon with oil of vitriol, a gas is given off; what is its composition? and what change does it experience when conducted into water?

8. If upon dropping muriatic acid into a saline solution, a white precipitate is obtained, it must include one or other of three metals; what are these, and how would you determine which of the three is present?

9. Give the action of ferrocyanide of potassium on a persalt of iron, and of ferridecyanide of potassium on a protosalt of same metal.

10. What is the composition of the reagent usually known under the name of hydrosulphuret of ammonia?—how is it made?—and what are the metals which it first precipitates from their solutions, and, when added in excess, redissolves?

11. Mention the hemihedral forms occurring in the first and third systems, and give the notation of each.

12. A right rhombic prism is terminated by a pair of planes resting on the acute lateral edges; what is the notation of these planes?

MR. GALBRAITH.

1. From Regnault's expression for the quantity of heat measured from 0°C . contained in a kilogram of steam of the temperature T° , deduce the corresponding expression in English units for the quantity measured from 0°F . in one pound.

2. Find the expression for the amount of heat expended in overcoming external pressure when a pound of water is converted into steam.

3. How much steam at 212° is required to raise from 8° to 25° the water contained in a cylindrical vessel of 2.5 diameter, and standing at a height of 0.75.

4. State the general rule which determines the poles of a needle which has been magnetized by a current circulating round it in a helix of copper wire.

5. Investigate the expression for the force with which a circular current acts on a magnetic pole situated in its axis, and at a distance d from its centre.

6. Give the general expression for the intensity of a current, taking into account the size and distance of the plates, the length and section of the interpolar, together with the resisting powers of the exciting fluid and the material of the interpolar.

Ethics.

MR. ABBOTT.

1. Give a brief account of Cicero's arguments for the Immortality of the Soul.

2. "Auctoribus ad istam sententiam uti optimis possumus." State fully the argument here indicated.

3. What are the most important arguments employed by modern writers on Natural Theology which are not mentioned by Cicero?

4. Butler observes that "it is scarce possible to avoid supposing particular affections to remain in a future state." How do the arguments of Cicero bear on this question?

5. State the distinction Aristotle makes between objective and subjective Justice, and his application of it. What was Shaftesbury's argument with respect to Moral Discipline founded on this distinction, and Butler's reply?

6. How does Aristotle examine the question, *ποία τις ἔστιν ἡ φύσις τῆς ἀρετῆς*?

7. State, briefly, Smith's arguments to prove that the principle of Approval is founded on Sympathy.

8. What are his objections to Hutcheson's theory of a Moral Sense?

BUTLER'S SERMONS.

DR. WEBB.

1. How does Butler demonstrate the truth of the assertion that "to love our neighbour as ourselves includes in it all virtues"?

2. Show that the Author and Cause of all things may be an adequate supply to all the faculties of our souls;—a subject to our Understanding, and an object to our Affections.

3. Show that, however perfect things are, they must ever necessarily appear to us otherwise less perfect than they are; and give Butler's illustration.

4. How far, and in what ways, are Propension and Self-love conducive to the private good of the individual?

History, Political Science, and English Literature.

HISTORY.

PROFESSOR BARLOW.

1. What were the principal sources of the revenues of the kings of France before the Revolution? Explain in particular the nature of the Droit de Garde, Droit de Gîte, Droit de Franc Fief, and Droit d'Aubain.

2. Give a short account of—(a) the Battle of Ivry, (b) the Peace of Vervins, (c) Marshal de Biron.

3. By what name is Nov. 11th, 1630, known in French history, and for what reasons?

4. Show by genealogical tables the claims of France, Bavaria, and Austria to the Spanish Succession at the commencement of the war.

5. Give some account of the administration of Cardinal Fleury.

6. Enumerate the leading events in French history which took place during the reign of Henry II.

7. What is Hallam's opinion as to the legality and expediency of the famous sentence which brought Mary Queen of Scots to the scaffold?

8. He contrasts the conduct of Charles I. during the rebellion with that of his illustrious father-in-law under somewhat similar circumstances?

9. Give an account of the proceedings against Oxford and Bolingbroke in 1715. How did they terminate? What is Hallam's opinion as to their expediency?

10. The most celebrated of the early cases of privilege of Parliament is that of Thomas Thorpe, Speaker of the Commons in 31 Henry VI.; what was this case, and how was it decided?

ENGLISH LITERATURE.

PROFESSOR INGRAM.

1. Is there any etymological connexion between the following words?—

- a. *author* and *authentic*.
- b. *tact* and *tactics*.
- c. *vile* and *villain*.
- d. *equipage* and the Latin *equus*.
- e. *propitiation* and the Latin *patior*.

2. Give an account of the works of Thomas Fuller. Name and describe other writings of the seventeenth century similar in character to the "Holy and Profane State."

3. Give the substance of Mr. Craik's remarks on the genius and writings of Richardson, Fielding, and Smollett.

4. Write an essay on the history of Literary Criticism in England.

5. What is the opinion maintained by Mr. Robert Chambers concerning the ballad poetry of Scotland? and what are the grounds of this opinion?

6. Give an account (with quotations) of the subject and spirit of Wordsworth's "Laodamia."

Classics.

PLATO.

MR. MAHAFFY.

Translate the following passages:—

1. *Beginning*, Ολον, ἦν δ' ἐγὼ, εἰργάσασθε, ἐπιλαβόμενοι μου; κ. τ. λ.,
Ending, καὶ μὴ ἀπατεῶνα ἡμῶν. ἀλλὰ θαρρῆσας λέγε.

Republic, lib. v. 2.

2. *Beginning*, Ἀρίσκει οὖν, ἣν δ' ἐγὼ, ὥσπερ τοπρότερον, κ. τ. λ.
Ending, ἀλλ' ἔχειν ἤδη τέλος τὰ τῶν μαθημάτων; Ἐμοιγ', ἔφη.
Ibid., lib. vii. 14.
-

1. Discuss the benefits which resulted from the teaching of the Sophists.

2. What was the nature of Plato's Ideas?

3. His political philosophy is objected to, as being unpractical; is this objection a fair one?

4. The gradual development of his views helps us to arrange the order of his works?

CICERO.

MR. LONGFIELD.

Translate the following passages:—

1. *Beginning*, Hæc quoque magna nunc contentio forum tenet.
Ending, Servilius de repetundis saucius Pilio tradetur.
Epp. ad Div., viii. 8.
2. *Beginning*, Sed oppressus tantum attigit negotii,
Ending, Sed de hoc Cæsar viderit.
Ibid., xiii. 29.
3. *Beginning*, De Cælio, vide, quæso, ne qua lacuna sit in auro.
Ending, spero esse, ut volumus.
Epp. ad Att., xii. 6.
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JUNIOR SOPHISTERS.

Mathematics.

DR. SALMON.

1. How can the amount of the variation of the compass be ascertained at sea?

2. Find when twilight is shortest at a given place.

3. Calculate the deviation from the plane of the meridian of the vertical plane containing Alioth and the pole star.

4. A body describes a conic under the influence of a force varying as the inverse square of the distance; express the axis major and eccentricity of the conic in terms of the initial conditions of the motion.

5. Find formulæ of reduction for integrating $e^x \cos x dx$.

6. Find the centre of gravity of a hemisphere.

MR. W. ROBERTS.

7. What are the elements necessary for the computation of the heliocentric latitude and longitude of a planet? and show how the expressions for them are obtained.

8. Illustrate the phenomena of aberration by means of the composition of velocities; and find the axes of the ellipse of aberration.

9. Given the velocity of projection, determine the elevation so that the projectile may strike a given point.

10. Find the tension of a string passing over a fixed pulley, and connecting two heavy bodies in motion whose weights are W , W' .

11. If $x = a \cos \phi$, $y = b \sin \phi$, find the value of $\frac{d^2 y}{dx^2}$ in terms of ϕ .

12. Find the value of the integral

$$\int \frac{x dx}{x^2 - 1}.$$

MR. CONNER.

13. Describe Flamstead's method of finding the right ascension of the Sun.

14. How may the declination be obtained by observations made out of the meridian?

15. Find the change of altitude of a star when near the meridian in a given time.

16. Find the coefficient of friction when a beam supported by a horizontal and vertical plane makes in its limiting position an angle of 30° with the horizon.

17. Find the time of revolution of a conical pendulum.

18. Find the integral

$$\frac{x dx}{(m + nx^2)^{\frac{1}{2}}}.$$

Experimental Physics.

HEAT.

DR. APJOHN.

1. If a bar of metal be 10 inches long at 60° F., and $10 + d$ inches long at 100° , what is its coefficient of expansion?

2. A hollow ball of glass, whose coefficient of lineal expansion is 0.000044, has at 32° an internal diameter of 1 inch; what weight of mercury will it contain at 250° on the following hypotheses?—

1°. That the weight of a cubic inch of water at 60° equals w .

2°. That the specific gravity of mercury compared to that of water at the common temperature of $60^{\circ} = g$.

3. If G be the density of a substance as given in the French Tables, and e its coefficient of expansion, what will be its density when it and the water with which it is compared are at the common temperature of 60° ?

N. B.—The volume of water at its point of maximum density being 1, that of water at 60 is 1.00095.

4. In a U tube held vertically a liquid was placed, and one leg being kept at 48° F., and the other raised to 186° , the difference of heights of the two columns was found to be $\frac{1}{10}$ th of an inch. From these *data*, and the known height h of the column maintained at 48° , deduce the coefficient of the expansion of the liquid.

5. If a portable barometer whose correction for capacity is $\frac{1}{16}$, and whose neutral points of temperature and pressure are 65° and 30.012, stands at a height h , the quicksilver having the temperature t , what is the true height H (this being assumed greater than 30.012), the quicksilver being supposed reduced to 32° ?

6. Forbes has found in Switzerland that the difference of a single degree in the boiling point of water always corresponded, within the range of his experiments, to the same difference of elevation; why should this be the case?

7. Assuming, with Regnault, that the latent heat of aqueous vapour at 32° is 607° F., calculate, by means of his empirical formula, what its total heat and its latent heat will be at 265° .

8. In a hygrometric experiment with a wet and dry thermometer, the latter showed a temperature of 68° F., the former of 56° ; what is the force of vapour corresponding to the dew-point, that of vapour at 56° being 0.4488?

9. What is the electrical method of proving that liquids, when in the *spheroidal* state, are not in contact with the vessels which contain them?

10. A hollow ball of brass, whose inner diameter is 2.25 inches, and thickness half an inch, was filled with benzole, then raised to the temperature of 170° , and agitated in a pint of water at 45° until it and the water had acquired the same temperature. Calculate what this common

temperature would be, assuming that there was no heat absorbed by the vessel containing the water, and using the following constants:—

Specific heat of benzole,	0.45.
Specific gravity of benzole,	0.85.
Specific heat of brass,	0.9391.
Specific gravity of brass,	8.29.
Weight of a cubic inch of water in } vacuo at the temperature of 60°, }	252.816 grains.

MR. GALBRAITH.

1. What is Regnault's formula for the total heat of steam?
2. Convert this into the corresponding formula adapted to the Fahrenheit scale.
3. If an electric pendulum be made to oscillate before a spherical insulated conductor charged with electricity of an opposite name, it is found that the duration of a given number of oscillations is proportional to the distance between the centres of the pendulum and the sphere: from this deduce the law of electric attraction.
4. If a charged Leyden jar be placed on an insulating stand, and discharged in the usual way, show that after the discharge the armatures will retain a charge of free electricity whose tension is one quarter of that which was free on the inner armature before discharge.
5. Describe the experiment by which it is shown that the direction of a current may be reversed by simply changing the exciting fluid.

DR. HAUGHTON.

1. A railway train is going smoothly along a curve of 500 yds. radius at the rate of 30 miles an hour; find at what angle a plumbline hanging in one of the carriages will be inclined to the vertical.
2. A pendulum which oscillates seconds at one place is carried to a place where it gains 2 minutes in 24 hours; compare the force of gravity at the two places.
3. If a prismatic diving bell, whose height is c , be sunk so that its top is at a depth a , and the height of the water barometer be h ; find the space occupied by the compressed air in the bell.
4. If a hemispherical diving bell be sunk in water until the surface of the water inside the bell bisect its vertical radius; find the depth of the bell.
5. Explain the phenomenon known as the Harvest Moon.

History and English Literature.

ENGLISH LITERATURE.

PROFESSOR INGRAM.

1. Three different theories have been propounded with respect to the origin of romantic poetry and fiction in modern Europe?

2. The dates of Layamon's Brut, and of the Vision of Piers Ploughman, may be approximately fixed by means of internal evidence?

3. Give an account of the substance and spirit of the "Mother Hubbard's Tale" of Spenser.

4. Describe the metre or form of stanza in which each of the following poems is written:—Barbour's "Bruce," Chapman's "Translation of the Iliad," Chapman's "Translation of the Odyssey," Warner's "Albion's England," Drayton's "Polyolbion," Chaucer's "House of Fame," Shakspeare's "Venus and Adonis," Shakspeare's "Rape of Lucrece."

5. Name the authors of the following plays:—"The Spanish Tragedy;" "The Virgin Martyr;" "A Woman killed with Kindness;" "The City Madam;" "The Duchess of Malfy;" "King David and Fair Bethsabe;" "The Faithful Shepherdess."

6. In what plays of Shakspeare do the following *dramatis personæ* respectively appear:—Ariel, Caliban, Dogberry, Bottom, Falstaff, Touchstone, Slender, Malvolio, Don Adriano de Armado?

7. Explain fully the following passages from Shakspeare (Knight's Text), and comment on any remarkable words or phrases which occur in them:—

a. "Bring me to the test,
And I the matter will re-word, which madness
Would gambol from."

b. "Your ladyship is nearer heaven, than when I saw you last, by the altitude of a chopine. Pray God, your voice, like a piece of uncurrent gold, be not cracked within the ring."

c. "Not so, my lord! I am too much i' the sun."

d. "Is it a fee-grief,
Due to a single breast?"

e. "Ay, but *while the grass grows*—the proverb is somewhat musty."

f. "Not to comply with heat (the young affects
In me defunct) and proper satisfaction."

g. "Election makes not up in such conditions."

h. "Do you but mark how this becomes the house?

'Dear daughter, I confess that I am old!
Age is unnecessary: on my knees I beg
That you vouchsafe me raiment, bed, and food.' "

- i. " You have ta'en these tenders for true pay,
Which are not sterling. Tender yourself more dearly,
Or (not to crack the wind of the poor phrase,
Roaming it thus) you'll tender me a fool."
- j. Letting I dare not wait upon I would,
Like the poor cat i' the adage."
8. a. What remark respecting Bacon's style does Macaulay illustrate by a comparison of the *Essay on Studies* with the *Essay on Adversity*?
- b. Give the substance of the latter *Essay*, using, as nearly as possible, Bacon's own language.
9. Bring out fully the meanings of the following sentences:—
- a. "Imitation is a globe of precepts."
- b. "The parable of Pythagoras is dark, but true—'Cor ne edito,' eat not the heart."
- c. "Abeunt studia in mores."
- d. "I cannot call riches better than the baggage of virtue."
- e. "He that hath wife and children, hath given hostages to fortune."

HISTORY.

PROFESSOR BARLOW.

1. How does Guizot account for the Albigensian Crusades? What were their immediate, what their ultimate, effects upon the Feudal System?
2. Give some account of the origin and early history of the Parliament of Paris.
3. Write short notices of the following events:—
The Crusade of the Children;
The Abolition of the Templars;
The Battle of Courtrai.
4. Who were the following persons?—
Brancaleone;
Henry of Cosenza;
Napoleon della Torre.
5. Give a short account of the usurpation, administration, defeat, and death of Manfred.
6. What, according to Hallam, were the main causes of the singular success of Edward III. in his French expedition?
7. What period in German history is usually denominated *the grand interregnum*? What were the causes of this? Give Hallam's account of the state of the Germanic Constitution at this time.
8. What were the theories of Selden and Madox as to the nature of baronies?
9. The year 1265 was an epoch of much importance in English history—for what reasons? Explain this fully.

10. Give an account of the Statute entitled *Confirmatio Chartarum*, and point out the leading difference between it and Magna Charta.

11. Who were the principal claimants of the Scottish throne on the death of the Maid of Norway, and how was the dispute terminated?

12. What were the most important events in English history which took place during the reign of Æthelred II.?

Classics.

SOPHOCLES.

MR. MAHAFFY.

Translate the following passages :—

1. *Beginning*, "Ἵπν' ὀδύνας ἀδαΐης, Ἵπνε δ' ἀλγέων, κ. τ. λ.
Ending, πολὺ παρὰ πόδα κράτος ἄρνυται. *Philoctetes*, 810-821.
2. *Beginning*, ΟἶΔ. ὦ φίλταθ', ὥς νῦν πᾶν τελοῦντι προξένει, κ. τ. λ.
Ending, τιθεῖς ἱλαίας τάσδ' ἐπιεύχεσθαι λιτάς. *Œdip. Col.*, 461-481.
3. *Beginning*, μὴ φῦναι τὸν ἅπαντα νι-, κ. τ. λ.
Ending, κακὰ κακῶν ξυνοικεῖ. *Ibid.*, 1220-1234.
4. *Beginning*, ὦ κοινὸν αὐτάδελφον Ἴσμήνης κára, κ. τ. λ.
Ending, πρὸς τοὺς φίλους στείχοντα τῶν ἰχθρῶν κακά; *Antigone*, 1-10.
5. *Beginning*, Ὀσημ' ἔρωτος τοῦτ' ἐφίμερον κακόν· κ. τ. λ.
Ending, δρᾶν καὶ τὸ μὴ δρᾶν πολλάκις προΐεται. *Frag.*
6. *Beginning*, χοῦτως, ἰδήχθη τοῦτο τοῦννειδος λαβὼν, κ. τ. λ.
Ending, ἔχοντ', ἀπ' ἄκρας ἤκε πυργώδους πλακός. *Trachiniae*, 251-270.

1. Dr. Donaldson thinks Herodotus copied from Sophocles. Show from the parallel passages that the reverse is probably the case.

2. Sophocles seems to have been infected with the literary mannerism of his day. This appears both from his own statement and a comparison of contemporary writers?

3. Discuss the two changes he introduced into tragedy?

4. Criticise the female characters in his plays, and compare them.

5. What estimate did Aristophanes form of Sophocles?

6. What equivalents for play-bills did the Greeks use?
7. What Roman poet seems peculiarly to have caught the spirit of Sophocles? Why was the latter not imitated so much as Euripides?
8. What attempts have been made in modern times to imitate the Greek tragedy, and with what success?

LATIN SATIRISTS.

MR. POOLE.

Translate the following passages into English Prose :—

1. *Beginning*, Hoc ego commodius, quam tu, præclare senator,
Ending, Vita solutorum misera ambitione gravique.
 HORACE, lib. I. *Sat.* vi. 110-130.
2. *Beginning*, Adfertur squillas inter muræna natantes
Ending, Vix poterat.
Ibid., lib. II. *Sat.* viii. 42-64.
3. *Beginning*, Montani quoque venter adest, abdomine tardus,
Ending, Omen habes," inquit, "magni clarique triumphi."
 JUVENAL, *Sat.* iv. 107-125.
4. *Beginning*, "Una simus," ait. Votorum summa : quid ultra
Ending, Virro tenet phialas.
Ibid., *Sat.* v. 18-39.
5. *Beginning*, Si tibi crateras argenti incusaque pingui
Ending, Hæc cedo, ut admoveam templis, et farre litabo.
 PERSIUS, *Sat.* ii. 52-75.

1. That Juvenal was exiled for his attack on Paris, the favourite of Domitian, appears improbable from the writings of another poet?
2. Merivale contrasts the styles of Juvenal and Persius; and considers them to result from the periods at which they wrote?
3. The description given by Horace of the Satires of Lucilius shows their close connexion with the early Roman Satira? and quote the passages.
4. Sellar points out the circumstances in which the Roman Satire differed from the Old Athenian Comedy; and notices the reasons for these differences?
5. What is Merivale's account of the rise of the Stoical philosophy under the Empire; and of the fact of its having been tolerated?
6. Illustrate the rhetorical character of the education at Rome under the Emperors from Juvenal.
7. Give some account of the circumstances attending the rise of Tigellinus; and quote a passage to prove his influence.

8. Give a brief account of the events which occurred between the death of Nero and the accession of Vespasian ; stating where the principal engagements occurred. What was remarkable in the accession of Nero's successor ?

9. "Ventidius quid enim ? Quid Tullius ? Anne aliud, quam
Sidus et occulti miranda potentia fati ?
Servis regna dabunt, captivis fata triumphos."

JUV. *Sat.* vii.

"Experiar quid concedatur in illos,
Quorum Flaminia tegitur cinis atque Latina."

JUV. *Sat.* i.

What are the historical allusions in these passages ?

10. "Summa delumbe saliva
Hoc natat : in labris et in udo est Mænas et Attis ;
Nec pluteum cædit, nec demorsos sapit unguis."

PERSIUS, *Sat.* i.

"Tu neque anhelanti, coquitur dum massa camino,
Folle premis ventos,
Verba togæ sequeris junctura callidus acri."

PERSIUS, *Sat.* v.

- a. Translate ; and explain the force of the *first* passage.
b. Quote parallels from Horace for both passages.

11. Distinguish the cases in which *quominus* and *quin* are used after verbs ; and state when *quominus* alone is admissible.

12. State some of the cases in which a proposition limited by a condition, supposed *not* fulfilled, is yet expressed in the *indicative* mood.

MR. LONGFIELD.

Translate the following passage into Latin Prose :—

There is scarce anything more for the improvement of knowledge, for the ease of life, and the despatch of business, than for a man to be able to dispose of his own thoughts ; and there is scarce anything harder in the whole conduct of the understanding than to get a full mastery over it. The mind in a waking man has always some object that it applies itself to ; which, when we are lazy or unconcerned, we can easily change, and at pleasure transfer our thoughts to another, and from thence to a third, which has no relation to either of the former. Hence men forwardly conclude, and frequently say, nothing is so free as thought, and it were well it were so ; but the contrary will be found true in several instances ; and there are many cases wherein there is nothing more resty and ungovernable than our thoughts ; they will not be directed what objects to pursue, nor be taken off from those they have once fixed on ; but run away with a man in pursuit of those ideas they have in view, let him do what he can.—LOCKE, *Conduct of the Understanding*.

Translate the following passage into Latin Hexameters :—

Seeds, to our eye invisible, will find
On the rude rock the bed that fits their kind ;
There, in the rugged soil, they safely dwell,
Till showers and snows the subtle atoms swell,
And spread the enduring foliage ; then we trace
The freckled tower upon the flinty base ;
There all increase, till in unnoticed years,
The stony tower as grey with age appears ;
With coats of vegetation, thinly spread,
Coat above coat, the living on the dead ;
These then dissolve to dust, and make a way
For bolder foliage, nursed by their decay ;
The long-enduring ferns in time will all
Die, and depose their dust upon the wall,
Where the wing'd seed may rest till many a flower
Show Flora's triumph o'er the falling tower.

CRABBE.

Translate the following passage into Greek Prose :—

The city of Sparta, being unexpectedly attacked by a powerful army of Thebans, was in very great danger of falling into the hands of their enemies. The citizens, suddenly gathering themselves into a body, fought with a resolution equal to the necessity of their affairs ; yet no one so remarkably distinguished himself on this occasion, to the amazement of both armies, as Isidas, the son of Phœbidas, who was at that time in the bloom of his youth, and very remarkable for the comeliness of his person. He was coming out of the bath when the alarm was given, so that he had not time to put on his clothes, much less his armour ; however, transported with a desire to serve his country in so great an exigency, snatching up a spear in one hand, and a sword in the other, he flung himself into the thickest ranks of his enemies. Nothing could withstand his fury ; in what part soever he fought, he put the enemies to flight, without receiving a single wound. Whether, says Plutarch, he was the particular care of some god, who rewarded his valour that day with an extraordinary protection, or that his enemies, struck with the unusualness of his dress, and beauty of his shape, supposed him something more than man, I shall not determine.—SPECTATOR.

Translate the following passage into Greek Tragic Trimeters :—

Cassandra. Lay hold upon him, Priam, hold him fast :
He is thy crutch ; now if thou lose thy stay,
Thou on him leaning, and all Troy on thee,
Fall all together.

Priam. Come, Hector, come, go back :
Thy wife hath dream'd ; thy mother hath had visions ;
Cassandra doth foresee ; and I myself
Am like a prophet suddenly enrapt,
To tell thee that this day is ominous ;
Therefore, come back.

Hector. *Æneas* is afield ;
And I do stand engag'd to many Greeks,
Even in the faith of valour, to appear
This morning to them.

Priam. Ay, but thou shalt not go.

Hector. I must not break my faith.
You know me dutiful ; therefore, dear sir,
Let me not shame respect ; but give me leave
To take that course by your consent and voice,
Which you do here forbid me, royal *Priam*.

Troilus and Cressida, Act v., Scene iii.

SENIOR FRESHMEN.

Mathematics.

DR. SALMON.

1. The co-ordinates of the vertices of a triangle are $\cos \alpha, \sin \alpha$; $\cos \beta, \sin \beta$; $\cos \gamma, \sin \gamma$; find the equation of the line joining the feet of the perpendiculars let fall from the point $\cos \delta, \sin \delta$, on two sides of the triangle. Show from the symmetry of the equation that the line passes through the foot of the perpendicular let fall on the third side.

2. Calculate the determinant

$$\begin{vmatrix} a & b & c & d \\ b & c & d & a \\ c & d & a & b \\ d & a & b & c \end{vmatrix}$$

and resolve the result into its factors.

3. Find for the equation

$$x^n - np x^{n-1} + \frac{n(n-1)}{1 \cdot 2} q x^{n-2} - \frac{n(n-1)(n-2)}{1 \cdot 2 \cdot 3} r x^{n-3} + \&c. = 0$$

the value of the symmetric function $\Sigma a^2 (\beta - \gamma)^2$.

4. If $y = 1 + x^\theta$, find as far as the coefficient of x^4 the expansion of y in terms of x .

5. Eliminate by differentiation α and β from the equation

$$(y - \alpha)^2 = p(x - \beta).$$

MR. CONNER.

6. If a chord of a conic subtend a right angle at a given point, find its envelope.

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7. Find the direction of the axes of the ellipse of maximum eccentricity inscribed in a given triangle, and touching one side at its middle point.

8. Find the equation of the locus of the intersection of normals to an ellipse with perpendiculars from the centre.

9. Draw through a given point within an ellipse a chord such that the angle between the focal distance of its intersection with the curve may be bisected by a given line.

10. Find the equation whose roots are the functions $\frac{\alpha - \beta}{\beta - \gamma}$ of the roots of $x^3 - 3x - 18 = 0$.

MR. WILLIAMSON.

11. A, B , and O are points on a conic, of which A, B are fixed, and O is variable; prove that the locus of the intersection of the perpendiculars of the triangle AOB is a similar conic, and determine the condition that it should coincide with the given curve.

12. If ω be an imaginary cube root of unity, prove that

$$(1 + \omega)^{3r} = \pm 1, \quad (1 + \omega)^{3r-1} = \mp \omega,$$

where r is any integer.

13. If α, β, γ be the roots of the cubic $x^3 + px^2 + qx + r = 0$, prove that

$$\begin{vmatrix} (p + \alpha)^2, & \alpha^2, & \alpha^3, \\ \beta^2, & (p + \beta)^2, & \beta^3, \\ \gamma^2, & \gamma^2, & (p + \gamma)^2 \end{vmatrix} = 2p^3.r.$$

14. If $y = e^{mx} \sin nx$, show that

$$\frac{d^2 y}{dx^2} - 2m \frac{dy}{dx} + (n^2 + m^2)y = 0.$$

15. Find the locus of vertex of a triangle whose base angles move along one conic, and whose sides touch another.

DR. SALMON.

1. Find the co-ordinates of the foot of the perpendicular let fall from the point whose co-ordinates are $\cos \alpha, \sin \alpha$ on the line joining the points $\cos \beta, \sin \beta; \cos \gamma, \sin \gamma$.

2. If the equation of a conic is

$$\sqrt{la} + \sqrt{m\beta} + \sqrt{n\gamma} = 0,$$

what is the geometric meaning of the equation $la + m\beta - n\gamma = 0$?

3. Expand $\log \cos x$ as far as the coefficient of x^3 .

4. Find an expression for the radius of the circle circumscribing a spherical triangle.

5. Calculate for a biquadratic equation the symmetric function

$$\Sigma \alpha^2 \beta^2 (\gamma - \delta)^2.$$

6. What is the chance of throwing with a pair of dice two numbers whose sum shall be seven?

MR. CONNER.

7. Form the equation of the conic passing through the points (1, 2), (3, 5), (-1, 4), (-3, 1), (-1, 5).

8. Find the equation of the axis of a parabola given by the general equation.

9. Differentiate $\log \sin^{-1} (1 - x^2)^{\frac{1}{2}}$.

10. If $\sin y = x \sin (a + y)$, expand y in terms of x to four terms.

11. Calculate the value of $\sin 54^\circ$.

12. Find the radius of the circle touching the three sides of a spherical triangle.

MR. WILLIAMSON.

13. Differentiate the expressions

$$\frac{(x-1)^4}{(x-5)^{\frac{2}{3}} \cdot (x-3)^{\frac{4}{3}}}, \quad a^x \cdot \sin rx.$$

14. If α, β, γ be the roots of a cubic, prove that

$$\begin{vmatrix} \beta + \gamma, & \alpha, & a, \\ \beta, & \alpha + \gamma, & \beta, \\ \gamma, & \gamma, & \alpha + \beta \end{vmatrix} = 4r.$$

15. Find in terms of the coefficients of a cubic the value of

$$\alpha^2 \beta^2 + \alpha^2 \gamma^2 + \beta^2 \gamma^2,$$

α, β, γ being its roots.

16. Given three points and an asymptote to an hyperbola, construct the other asymptote; and hence determine the lengths of its axes.

17. Find the equation of the circle which osculates the conic

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

at a point $x'y'$.

18. Expand $\sin^{-1} x$ in terms of x .

Logics.

DR. MALET.

1. Give a summary of Locke's discussion on Moral Relations; and show that he is unjustly charged with denying the immutable distinction between Right and Wrong.
 2. Give an abstract of Locke's account of the idea of Infinity. To what single source does he ultimately reduce it? and show that his account is inconsistent with its application to the attributes of God.
 3. What are the various points of agreement and difference between the names of Modes, Substances, and Simple Ideas?
 4. Name and describe, accurately, the various acts of the Mind in relation to its Simple Ideas, and where the nature of Man first diverges from that of Brutes.
 5. What do you mean by the original and acquired perceptions of any sense? How does Locke account for the latter? and do you think his account correct?
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STEWART.

MR. ABBOTT.

1. What are Stewart's reasons for supposing that Belief accompanies Imagination? and how does he solve the difficulty arising from the phenomena of Memory?
 2. Discuss the influence of association on our judgments in matters of Taste.
 3. Account for the gradual improvement of Memory with respect to familiar subjects of study.
 4. State Stewart's theory of acquired Dexterities and Habits, and his arguments in its favour.
 5. Give the substance of Stewart's remarks on the origin of the common theories of Perception.
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DR. WEBB.

1. Describe the various functions attributed to "Phantasia" by Bacon.
2. The form of Induction proposed by the ancient Dialectic shows that the Art of Invention was a *desideratum*?
3. Describe the Modes of Experimenting which are (α) of the greatest Scientific value, (β) of the greatest Historical interest, and (γ) those which are peculiarly exposed to Fallacy.
4. Give some account of the "*Doctrina de Elenchis*."
5. State (α) the causes which have contributed to Realism, (β) the considerations which refute it, and (γ) the modifications of which the doctrine is susceptible.

Classics.

THUCYDIDES.

MR. MAHAFFY.

Translate the following passages :—

1. *Beginning*, πολεμικοί τε καὶ εὐβουλοὶ διὰ τὸ εὐκοσμον, κ. τ. λ.
Ending, ἀλλ' ὥς ἡμῶν αὐτῶν ἀσφαλῶς προνοουμένων. Lib. i. 84.
2. *Beginning*, Τίς οὖν αὕτη ἡ φιλία ἐγίγνετο, ἡ ἐλευθερία πιστῇ, κ. τ. λ.
Ending, ἀλλὰ προποιῆσαι. Lib. iii. 12, 13.
3. *Beginning*, καὶ γὰρ Βοιωτοὺς, καὶ τοὺς πολλοὺς τῶν ἄλλων, κ. τ. λ.
Ending, ὁ δὲ κήρυξ τῶν Ἀθηναίων ἀκούσας ἀπῆλθεν ἀπρακτος. Lib. iv. 98, 99.
4. *Beginning*, Γνοὺς δὲ ὁ Ἀλκιβιάδης, κ. τ. λ.
Ending, καὶ διὰ τάχους τὸν πλοῦν ἐποιοῦντο. Lib. viii. 12.

1. Give an account of Thucydides' estimate of the nature and importance of the Trojan war, and its relation to the previous and subsequent history of Greece.

2. He corrects a false tradition concerning an important event in Attic history at the close of the sixth century, B. C.

3. Mr. Grote discusses the value and object of the Melian dialogue?

4. Give an account of the speech of Euphemus in the sixth book.

5. How far did the events of the Peloponnesian war justify the policy and the anticipations of Pericles?

6. Discuss the use and value of the so-called demagogues, particularizing some of the cases where they guided the councils of the Athenians.

7. What was the intention of Thucydides, and other ancient historians in introducing speeches into their narratives? What was the value of their speeches?

8. What are the details, which have led historians to think, that Thucydides was present at one of the battles mentioned in his book?

TACITUS.

MR. POOLE.

Translate the following passages into English Prose :—

1. *Beginning*, At Romæ, postquam Germanici valetudo percrebuit,.....
Ending, donec tempore ac spatio vanescerent.

Annal., lib. ii. c. 82.

2. *Beginning*, Sub idem tempus de flamine Diali in locum
Ending, ut sedes inter Vestalium consideret." *Annal.*, lib. iv. c. 16.
 3. *Beginning*, Obstupescit ea alacritas ducem Romanum :
Ending, fratres quoque in deditionem accepti. *Ibid.*, lib. xii. c. 35.
 4. *Beginning*, Antonius per Flaminiam ad Saxa rubra,
Ending, propria dignatio viri. *Histor.*, lib. iii. c. 79, 80.
-

1. What is Merivale's criticism on the authority of the Annals of Tacitus as a source of historical knowledge; and his reasons for it?

2. He points out an important difference in the systems of administration of Augustus and Tiberius, and traces this to their individual characters?

3. The circumstances which gave rise to the *delatores* existed even in the times of the Republic; show this; and point out the causes which led to their being employed by the Emperors.

4. What were the measures of Sulla, as dictator, with a view to the re-establishment of the rule of the aristocracy?

5. That Claudius must have administered the state with economy is proved, by what fact?

6. Give some account of the career of Suetonius Paullinus in Britain.

7. What charges does Tacitus mention as having been brought against the character of Augustus by those opposed to him?

8. To what does Tacitus attribute the silence of the Greek and Roman historians as to the exploits of Arminius?

9. What description does Tacitus give of the early rule of Tiberius; and from what period does he date the change in his conduct?

10. Distinguish the cases in which the *descriptive ablative* or *descriptive genitive* are preferred in Latin.

11. Questions, which in the *oratio directa* would be in the *indicative mood*, are differently expressed in the *oratio obliqua* according to the *person* in which the verb would occur in the *indicative*?

12. Draw a map of Gaul, tracing on it the principal rivers, and the territories of the tribes which were most remarkable in the wars of Julius Cæsar.

MR. LONGFIELD.

Translate the following passage into Greek Prose:—

But the Carthaginians, weary of the expenses of the war, and suffering greatly in their commerce, thought that a fair opportunity for making peace was now offered. The Romans had recovered in some measure from their late disasters; but not so entirely but that they might be glad to listen to fair terms. Accordingly an embassy was dispatched to offer

an exchange of prisoners, and to propose terms on which a peace might be concluded. Regulus (according to the well-known story) accompanied this embassy, under promise to return to Carthage if the purposes of the embassy should fail. When he arrived at Rome, he refused to enter the walls and take his place in the Senate, as being no longer a citizen or a senator. Then the Senate sent certain of their own number to confer with him in presence of the ambassadors, and the counsel which he gave confirmed the wavering minds of the Fathers. "Useless it was," he said, "to ransom prisoners who had ignobly yielded with arms in their hands; let them be left to perish unheeded; let war go on until Carthage be subdued." His counsel prevailed, and the embassy returned without effect.—DEAN LIDDELL.

Translate the following passage into Greek Tragic Trimeters :—

It is not so ; thou hast misspoke, misheard ;
 Be well advis'd, tell o'er thy tale again :
 It cannot be ; thou dost but say, 'tis so :
 I trust I may not trust thee ; for thy word
 Is but the bare breath of a common man :
 Believe me, I do not believe thee, man ;
 I have a king's oath to the contrary.
 Thou shalt be punish'd for thus frightening me,
 For I am sick, and capable of fears ;
 Oppress'd with wrong, and therefore full of fears ;
 A widow, husbandless, subject to fears ;
 A woman, naturally born to fears ?
 And though thou now confess thou didst but jest
 With my vex'd spirits, I cannot take a truce,
 But they will quake and tremble all this day.
 What dost thou mean by shaking of thy head ?
 Why dost thou look so sadly on my son ?
 What means that hand upon that breast of thine ?—
 SHAKESPEARE, *King John*, Act iii. sc. 1.

Translate the following passage into Latin Prose :—

It was resolved to raise the youthful hero at once to a level with the great warriors Pompeius and Cæsar, by assigning him the honours of a triple triumph. The successes which he had obtained over the Dalmatians, in person or by his lieutenants, furnished the subject of the first ; the second was accorded to the great battle of Actium, which had broken the strength of the Egyptian aggressor ; while the last commemorated the final extinction of the rivalry of the East and West before the walls of Alexandria. The name of Antonius was not associated with these discomfitures ; the trophies exhibited were carefully confined to the spoils of the foreigner. Octavius triumphed on the seventh and following days of the month Sextilis, in the seven hundred and twenty-fifth year of the city. The spectacle of the last day was the richest and most attractive. The procession was headed by the captive children of the queen and her Roman lover ; and the figure of Cleopatra herself was introduced reclin-

ing lifeless upon a couch ; but the magistrates, who were wont to precede or accompany the triumphal car, were on this occasion directed to follow it, and mingled ignominiously with the officers of the victorious army ; an innovation which might be remarked as significant of the impending predominance of military power in the state.—*MÉRIVALE*.

Translate the following passage into Latin Hexameters :—

Yet one song more ! one high and solemn strain,
 Ere, Phœbus ! on thy temple's ruined wall
 I hang the silent harp : there may its strings,
 When the rude tempest shakes the aged pile,
 Make melancholy music. One song more !
 Penates ! hear me ! for to you I hymn
 The votive lay. Whether, as sages deem,
 Ye dwell in the inmost heaven, the counsellors
 Of Jove ; or if, supreme of deities,
 All things are your's, and in your holy train
 Jove proudly ranks, and Juno, white-armed queen,
 And, wisest of immortals, the dread maid,
 Athenian Pallas. Venerable powers !
 Harken your hymn of praise ! Though from your rites
 Estranged, and exiled from your altars long,
 I have not ceased to love you, household gods !
 In many a long and melancholy hour
 Of solitude and sorrow, hath my heart
 With earnest longings prayed to rest at length
 Beside your hallowed hearth. . . . for peace is there !

SOUTHEY.

JUNIOR FRESHMEN.

Mathematics.

A.

DR. SALMON.

1. Find the locus of the point at which two given portions of the same right line subtend equal angles.
2. Given two pairs of conjugate points belonging to a system in involution, determine the centre and foci of the system.
3. The three diagonals of a hexagon circumscribing a circle meet in a point ?

4. Given vertex, vertical angle, and rectangle under sides of a triangle; if the vertex of one base angle describe a right line or a circle, what will be the locus of the remaining vertex?

5. Find the locus of the middle point of a chord of a circle which subtends a right angle at a given point.

6. If any point on the perpendicular of a triangle be joined to the base angles, and the joining lines produced to meet the sides, the lines joining the points of meeting to the foot of the perpendicular make equal angles with the perpendicular?

MR. W. ROBERTS.

7. Several right-angled triangles have a common vertex, while the extremities of their hypotenuses rest on two given lines, perpendicular to each other. Find the locus of the intersection of the bisectors of the sides.

8. If the bisector of the base of a triangle be a mean proportional between the sides, prove that it will be equal to the bisector of the external vertical angle.

9. Being given a triangle ABC , draw a perpendicular through A to AC , and through B to BC , and let a line passing through C , and meeting these perpendiculars respectively in the points P , Q be bisected in C . Prove that a perpendicular drawn through C to PQ will make with either of the sides AC , BC an angle equal to that included between the other and the bisector of the side AB .

10. Being given a triangle, determine a point such that the sum of the perpendiculars dropped from it on the sides may be equal to a given line, the ratio of the sum of two of them to the third being also given.

11. Being given the base of a triangle, and the ratio of its sides, construct it so that the side of the inscribed square may be a maximum.

12. Construct a triangle, being given the base, ratio of sides, and the angle contained between the bisectors of the sides, drawn from the extremities of the base.

MR. CONNER.

13. Find the distance of the middle point of a line joining two conjugate points from the centre of the circle; the distance of the points being given.

14. Prove that a circle intersecting two others (radii r , r') at angles α , β intersects at right angles the coaxial circle whose centre is given by the relation $\frac{r \cos \alpha}{r' \cos \beta} = \frac{\delta}{\delta'}$; δ , δ' being distances of its centre from centre of given circles.

15. Prove that the centre of perspective of any triangle with any exscribed triangle inscribed to its polar circle is a point on the circle.

16. Given the rectangle under sides, bisector of base, and difference of base angles; construct the triangle.

17. Draw a chord of a circle parallel to a given line, so that the triangle standing on it and having its vertex at a given point may be a maximum.

18. Given in magnitude and order the three lines drawn from a point within it to three angles of a square; find the side of the square.

B.

DR. SALMON.

1. Solve the system of equations

$$3x - 4y + 5z = 8, \quad 2x + y - 3z = 9, \quad -3x - 4y + z = 10.$$

2. Find the value of the continued product

$$(\sqrt{x} + \sqrt{3} + \sqrt{-5})(\sqrt{x} + \sqrt{3} - \sqrt{-5})(\sqrt{x} - \sqrt{3} + \sqrt{-5}) \\ (\sqrt{x} - \sqrt{3} - \sqrt{-5}).$$

3. Write as far as the coefficient of x^3 the expansion of $(8 + 3x)^{\frac{1}{2}}$.

4. What is the chance of throwing a six in two throws with a single die?

5. A and B together can perform a piece of work in twelve days; and A alone would take ten days longer to do it than B. In how many days could each perform it separately?

MR. W. ROBERTS.

6. The sum of three numbers in harmonic progression is 13, and the sum of their squares is 61; find the numbers.

7. Show that integer numerical values of A, B, C , satisfying the equation $A^2 + B^2 = C^2$, may be obtained from the identical relation

$$(x + y\sqrt{-1})^3 (x - y\sqrt{-1})^3 = (x^2 + y^2)^3.$$

8. If $xy + yz + zx = (x + y + z)\sqrt[3]{xyz}$,

prove that one of the three quantities x, y, z is a mean proportional between the other two.

9. If $x + \frac{1}{x} = z$, express $x^4 + \frac{1}{x^4}$ in terms of z .

10. Find the value of

$$\frac{1}{(a-b)(a-c)(a-d)} + \frac{1}{(b-a)(b-c)(b-d)} + \frac{1}{(c-a)(c-b)(c-d)} \\ + \frac{1}{(d-a)(d-b)(d-c)}.$$

MR. CONNER.

11. Reduce $\frac{3x+5}{(x-2)(x-3)(x-5)}$ to its equivalent simple fractions.
12. Two persons jointly invest £700 in business; the one let his money remain 7 months, the other only 3; and each receives £500. How much did each invest?
13. Find two numbers such that their product shall equal the difference of their squares, and the sum of their squares shall equal the difference of their cubes.
14. The product of four numbers in arithmetic progression is 4480, and their common difference 6; find the numbers.
15. If $y = x - \frac{1}{3}x^3 + \frac{1}{5}x^5$, find x in a series of powers of y to the fourth term.

C.

DR. SALMON.

1. If $\cos \alpha + \cos \beta + \cos \gamma = 0$, $\sin \alpha + \sin \beta + \sin \gamma = 0$, prove that $\alpha - \beta = \text{either } 120^\circ \text{ or } 240^\circ$.
2. Prove that
- $$\cos \alpha + \cos \beta + \cos \gamma + \cos (\alpha + \beta + \gamma) = 4 \cos \frac{1}{2}(\alpha + \beta) \cos \frac{1}{2}(\alpha + \gamma) \cos \frac{1}{2}(\beta + \gamma),$$
- $$\sin \alpha + \sin \beta + \sin \gamma - \sin (\alpha + \beta + \gamma) = 4 \sin \frac{1}{2}(\alpha + \beta) \sin \frac{1}{2}(\alpha + \gamma) \sin \frac{1}{2}(\beta + \gamma).$$
3. If the base of a triangle be 36, and the two sides 25 and 29, calculate the lengths of the portions into which the perpendicular from the vertex on the base is divided where it meets the other perpendiculars.
4. If A, B, C be the angles of a plane triangle, prove that $\lambda = \frac{1}{2}$ is a root of the equation
- $$\lambda^2 (\sin^2 A + \sin^2 B + \sin^2 C) - \lambda \{ \sin^2 C + \sin A \sin B \cos (A - B) \} + \sin A \cos A \sin B \cos B = 0.$$
5. Prove that the area of a quadrilateral inscribable in a circle is
- $$\sqrt{(s-a)(s-b)(s-c)(s-d)}.$$
6. Two tangents to a circle whose radius is r are inclined at an angle $2A$; find the radius of the circle inscribed between the two tangents and the circle.

MR. W. ROBERTS.

7. Let ABC be a right-angled triangle, and P any point on the hypotenuse AB ; it is required to prove that
- $$\tan PCA : \tan PAC :: AP : BP.$$
8. Express the perpendicular dropped from the vertex of a triangle on its base, in terms of the base and the angles at the base.

9. Reduce to its simplest form the expression

$$2 \cos^2 \theta + \cos^2 2\theta - 2 \cos^2 \theta \cos 2\theta.$$

10. Resolve $x^2 - 2x \cos \theta + 1$ into its factors.

11. Expand $\operatorname{cosec} \theta$ in a series ascending by powers of $\cos 2\theta$.

12. Simplify the expression

$$\cos^2 \theta + \cos^2 \phi + \cos^2 (\theta + \phi) - 2 \cos \theta \cos \phi \cos (\theta + \phi).$$

MR. CONNER.

13. Prove geometrically that the ratio of the radius of the inscribed circle to that of an escribed circle is equal to the product of the tangents of the halves of the angles adjacent to the side which it touches.

14. Given the sum of the cotangents of the halves of the angles of a triangle; find their product.

15. Express the sine of half an angle in terms of the sine of the angle; and hence deduce the value of $\sin 15^\circ$ from the value of $\sin 30^\circ$.

16. Given the three sides of a triangle, express the bisector of an angle in the simplest form to which it can be reduced.

17. If $\sin \theta = n \sin (\theta + \phi)$, find θ in a series of sines of multiples of ϕ .

18. Assuming the formula

$$\log (1 + y) = M (y - \frac{1}{2} y^2 + \frac{1}{3} y^3 \text{ \&c.}),$$

prove that

$$a^x = 1 + \frac{x}{M} + \frac{1}{1.2} \frac{x^2}{M^2} + \frac{1}{1.2.3} \frac{x^3}{M^3} \text{ \&c.},$$

when M is the modulus of a system of logarithms to the base a .

D.

DR. SALMON.

1. If P the foot of perpendicular of a triangle be joined to Q , the intersection of bisectors of sides, and the joining line produced on to meet the circumscribing circle in R ; prove that PQ is half QR .

2. If perpendiculars be let fall on the sides of a triangle from opposite extremities of any diameter of the circumscribing circle; prove that the two lines joining the feet of the perpendiculars—

(a) Are at right angles to each other;

(b) Meet on the circle through the middle points of sides.

3. Given two pairs of conjugate points a, b, a', b' of a system in involution; find a third pair of conjugate points c, c' such that the distance cc' shall be given.

4. Given two points E, F on a circle; draw through a given point P a line meeting the circle in two points M, N , such that the anharmonic ratio of $EFMN$ may be given.

MR. W. ROBERTS.

5. From a given triangle let a second be derived, the sides of which are the bisectors of the sides of the first; prove that a third triangle derived in the same way from the second will be similar to the first.

6. Two triangles, ABC , ABD , stand on the same base AB ; if the bisectors of the external vertical angles cut at right angles in the point P , prove that the middle point of the line CD , the middle point of the base AB , and the point P , lie on the same right line.

7. The rectangle under any two sides of a triangle exceeds the square of the line joining the vertex in which they meet with the centre of the inscribed circle by the rectangle under the diameters of the inscribed and circumscribed circles.

8. Let β , β' , β'' be the bisectors of the angles of a triangle of which the sides are a , b , c , and A the area; prove that

$$\beta\beta'\beta'' = \frac{4abc(a+b+c)A}{(a+b)(b+c)(c+a)}.$$

MR. CONNER.

9. If two vertices of a triangle circumscribed to a circle lie on two of the sides of a self-conjugate triangle, prove that the third vertex will lie on the remaining side, and that the two triangles are in perspective.

10. Prove that a variable circle intersecting two fixed circles at constant angles cuts them homographically.

11. Prove that the locus of the points at which two circles subtend equal angles is the coaxal circle which passes through their centres of similitude.

12. If, on a line passing through a centre of similitude of two circles, two points be taken which are harmonic conjugates with both pairs of the corresponding points in which it intersects them, prove that they lie on a circle whose centre coincides with the centre of similitude.

Classics.

DEMOSTHENES AND ÆSCHINES.

MR. MAHAFFY.

Translate the following passages:—

1. *Beginning*, Καίτοι τίνα βούλει σέ, Αἰσχίνη, κ. τ. λ.
Ending, ἐγὼ δ' ὑπὲρ τῆς πατρίδος.

DEM. de Coroná, 288.

2. *Beginning*, δεύτερον δὲ καὶ πολὺ τούτου μείζον, κ. τ. λ.

Ending, τὸν κίνδυνον ἀπαρασκεύῃ τῇ πόλει.

ÆSCHINES, 420.

3. *Beginning*, οἰκοδομήματα μὲν γε καὶ κόσμον τῆς πολέως, κ. τ. λ.

Ending, καὶ ὑμεῖς ἀγαπᾶτε ἃ ἂν οὗτοί μεταδιδῶσι λαμβάνοντες.

DEM. 174.

1. What was the real nature of the amphiktyonic council, and to what bodies in mediæval Europe may it be compared?

2. Mr. Grote contrasts the Spartan and Athenian hegemonies, as to the amount of oppression suffered under each?

3. What was the celebrated discussion between Epaminondas and Agesilaus previous to the rupture between Thebes and Sparta?

4. Give a short account of the career of Agesilaus.

5. What points of similarity were there between the education of Epaminondas and that of Alexander?

6. Describe the extent, and the state of the Persian empire in the fourth century, B. C., and show the natural course by which events led to Alexander's invasion.

7. The colonies of Alexander seem to show a fixed design and a deliberate policy?

8. What modern parallel is there to the state of Macedonia under Philip (the father of Alexander)?

CICERO.

MR. LONGFIELD.

Translate the following passages:—

1. *Beginning*, Jam vero illud non solum contra legem Hieronicam, . . .

Ending, confiteatur necesse est.

In Verrem, act. II. lib. iii. § 15.

2. *Beginning*, Cum eodem Apronio postea P. Scandilius,

Ending, recuperatores dicit se de cohorte sua daturum.

In Verrem, Act. II. lib. iii. § 59.

3. *Beginning*, Petere consulatum nescire te, Servi,

Ending, aut suam operam et gratiam iudicio et accusationi reservant.

Pro Murena, § 21.

1. Explain the mode of conducting business in the *Comitia Centuriata*. How was the elective power of the centuries controlled by that of the tribes?

2. What occasioned the tumults which interrupted the *Comitia* when Cicero was a candidate for the *Prætorship*?

3. Mention the most remarkable of his oratorical triumphs in the year of his *Consulship*.

4. Mr. Forsyth is at issue with Niebuhr as to the constitutional legality of the punishment of the Catilinarian conspirators?

5. State some of the causes of the demoralization of the Roman people about the time of the first Triumvirate.

6. Mention some occasions on which Cicero supported the knights, though he knew and admitted that their cause was bad.

7. The Senate evinced contemptible weakness at the commencement of the civil war between Cæsar and Pompey? What terms did Cæsar subsequently propose to the senate?

8. Write historical notes on the following passages:—"Cneius Octavius, consul, armis ex urbe collegam suum expulit; omnis hic locus acervis corporum, et civium sanguine redundavit."—*Cat.* III. 10. "Quid ego hic equites Romanos commemorem? quos ex multorum annorum disensione ad hujus ordinis societatem concordiamque revocatos, hodiernus dies vobiscum et hæc causa conjungit."—*Cat.* IV. 7.

9. Mark on a map the positions of the chief cities in ancient Sicily, distinguishing those of Ionian and Dorian origin, and, where cities still exist on the same sites, giving the modern names.

10. Where were the rivers Athesis, Bætis, Liger, Hierasus, Arar, and Tyras, and what are their modern names? Give the ancient and modern names of the great lakes in North Italy.

11. *a.* "Visæ nocturno tempore faces ardorque cœli."—*Cat.* III. 8.

b. "Quis potest esse tam aversas a vero, qui neget, hæc omnia, quæ videmus, deorum immortalium potestate administrari."—*Cat.* III. 9.

c. "Tum subito Catilina scelere demens, quanta conscientiæ vis esset, ostendit."—*Cat.* III. 5.

When may the gender of the predicate be regulated by the nearest subject, as in (*a*)? Explain the difference of mode in the relative clauses in (*b*). Write a note on the use of the past tense in the dependent clause in (*c*).

12. Write notes on the derivation of the words *fortasse*, *supplicium*, *rurus*, *festino*, *debilia*, *perniciēs*, *vehemens*, *consul*, *amicō*, *perpetuus*.

MR. POOLE.

Translate the following passage into Greek Prose:—

It was still the depth of winter when Pyrrhus himself arrived at Tarentum. His fleet had been dispersed by a storm on the passage, and he himself had been obliged to disembark on the Messapian coast with only a small part of his army, and to proceed to Tarentum by land. After a time, however, his scattered ships reached their destination safely, and he found himself powerful enough to act as the master rather than the ally of the Tarentines. He shut up the theatre, the public walks, and the gymnasia, obliged the citizens to be under arms all day, either on the walls or in the market-place, and stopped the feasts of their several clubs or brotherhoods, and all revelry and all riotous entertainments throughout the city. Many of the citizens, as impatient of this discipline as the

Ionians of old when Dionysius of Phocæa tried in vain to train them to a soldier's duties, left the city in disgust; but Pyrrhus, to prevent this for the future, placed a guard at the gates, and allowed no one to go out without his permission.—ARNOLD'S *ROME*.

Translate the following passage into Greek Verse :—

Aum. How brooks your Grace the air,
After late tossing on the breaking seas?

K. Rich. Needs must I like it well: I weep for joy,
To stand upon my kingdom once again.
Dear earth, I do salute thee with my hand,
Though rebels wound thee with their horses' hoofs:
As a long parted mother with her child
Plays fondly with her tears and smiles in meeting,
So, weeping, smiling, greet I thee, my earth,
And do thee favour with my royal hand.
Feed not thy sovereign's foe, my gentle earth,
Nor with thy sweets comfort his ravenous sense;
But let thy spiders, that suck up thy venom,
And heavy-gaited toads, lie in their way,
Doing annoyance to the treacherous feet
Which with usurping steps do trample thee.

SHAKESPEARE, *King Richard II.*

Translate the following passage into Latin Prose :—

It very often happens, that none are more industrious in publishing the blemishes of an extraordinary reputation, than such as lie open to the same censures in their own characters, as either hoping to excuse their own defects by the authority of so high an example, or to raise an imaginary applause to themselves, for resembling a person of an exalted reputation, though in the blameable parts of his character. If all these secret springs of detraction fail, yet very often a vain ostentation of wits sets a man on attacking an established name, and sacrificing it to the mirth and laughter of those about him. A satire or a libel on one of the common stamp, never meets with such reception and approbation among its readers, as what is aimed at a person whose merit places him on an eminence, and gives him a more conspicuous figure among men. Whether it be, that we think it shows greater art to expose and turn to ridicule a man whose character seems so improper a subject for it, or that we are pleased by some implicit kind of revenge, to see him taken down and humbled in his own reputation, and in some measure reduced to our own rank, who had so far raised himself above us, in the reports and opinions of mankind.—

SPECTATOR, No. 256.

Translate the following passage into Latin Lyric Verse :—

Beneath those fruit-tree boughs that shed
Their snow-white blossoms on my head,
With brightest sunshine round me spread
Of spring's unclouded weather,
In this sequestered nook how sweet
To sit upon my orchard-seat,
And flowers and birds once more to greet
My last year's friends together !

One have I marked, the happiest guest
In all this covert of the blest ;
Hail to thee, far above the rest
In joy of voice and pinion ;
Thou, Linnet ! in thy green array,
Presiding spirit here to-day,
Dost lead the revels of the May,
And this is thy dominion.

Upon yon tuft of hazel trees,
That twinkle in the gusty breeze,
Behold him perch'd in ecstasies,
Yet seeming still to hover ;
There ! where the flutter of his wings
Upon his back and body flings
Shadows and sunny glimmerings,
That cover him all over.

WORDSWORTH.

EXAMINATION FOR LICENSE IN ENGINEERING.

MR. TOWNSEND.

THEORETICAL MECHANICS.

1. A uniform beam resting perpendicularly against a rough vertical wall is held in equilibrium by a cord connecting its free extremity with a fixed point in the wall; given the particulars of the system, determine the tension on the cord and the pressure on the wall.
2. Determine, in the same case, the limiting coefficient of friction requisite to prevent the sliding of the extremity in contact with the wall.
3. A heavy weight rests on a rough inclined plane; given the coefficient of friction and the inclination of the plane, determine the directions of the least forces that will suffice just not to move the weight upwards and downwards.
4. Given the angles of cleavage and friction of a rough isosceles wedge; required the ratio of the forces requisite to force it into and to extract it again from a given position of equilibrium.
5. In a triangular frame held in equilibrium by three forces acting at its three joints, represent by a diagram the ratios of the acting forces and resulting tensions on the bars.
6. Given the span, fall, and weight of a suspension bridge; determine the lengths and terminal tensions of the several supporting chains.
7. Determine the conditions under which a horizontal elastic beam of any transverse section will undergo no horizontal deflection at any point under the action of a vertical load.
8. For a uniformly distributed load, determine the entire bending moment at any point of the beam, supposed supported but not fixed at both ends.
9. For a beam of uniform depth, and of strength proportional at every point to the magnitude of the bending moment whatever be the distribution of the load, show that the form of equilibrium is always an arc of a circle.
10. A uniform bar revolving round a fixed axis transverse to its length strikes against a fixed obstacle; determine the conditions that there be no shock on the axis at the moment of impact.
11. In the direct collision of two perfectly elastic balls, show that the entire amounts of accumulated work before and after impact are equal.
12. If the centre of gravity of any free system of bodies be at rest, show that the bodies themselves cannot put it in motion by their mutual actions.

PRACTICAL MECHANICS.

1. A bank of earth, 20 ft. high, sp. gr. = 1.75, natural slope = 45° , and upper surface horizontal, presses against a vertical wall; calculate the entire pressure per foot of length of the wall.
2. If the wall be of granite, sp. gr. = 2.75, and of the same height with the bank; calculate the least thickness that will prevent its overthrow.

3. Two opposite sides of a rectangular reservoir of water, 25 ft. deep, 100 ft. long, and 50 ft. broad at the surface of the water, are inclined at the common inclination of 75° to the horizon, while the other two are vertical; calculate the total pressures on the several faces.

4. A railway train, moving at the rate of 30 miles an hour, runs through a mile before it stops, when the steam is shut off, and the breaks applied; calculate the resistance in pounds per ton of its weight.

5. If the train, moving at the same rate round a curve of quarter of a mile radius, exert no lateral pressure against the rail supposed 5 ft. apart; calculate the difference of their level in inches.

6. The rim of a fly-wheel of cast iron, sp. gr. = 7.25, performing six revolutions per minute, is 6 in. thick, and its inner and outer radii are 4 and 4.5 ft., respectively; calculate in foot pounds the entire amount of work accumulated in it.

GEOLOGY AND MINING.

DR. HAUGHTON.

1. Describe the physical, chemical, and pyrognostic characters of Pitchblende.

2. With what minerals is Wolfram liable to be confounded; and how may it be distinguished by physical and pyrognostic characters?

3. Name the ores of iron; and state the principal mines famous for the production of each.

4. Describe the quantitative method of ascertaining the amount of Arsenic in a specimen of Mundic.

(*) 5. A lode bears E. 20° N. and underlays 64° N., and is intersected by another lode bearing N. 32° E. whose underlay is 52° S. Find by construction the intersection of these lodes, and its underlay.

(*) 6. Verify the preceding construction by calculation.

(*) 7. Given the following course of traverse dialling, made with a left-hand dial; find the distance and bearing of the end.

No.	Draft.	Bearing.
1	36.00	162°
2	44.33	$143\frac{3}{4}$
3	30.75	$16\frac{1}{2}$
4	28.50	$257\frac{1}{4}$
5	17.83	45
6	15.25	$7\frac{3}{4}$
7	72.00	$152\frac{1}{2}$
8	16.00	$87\frac{1}{2}$
9	73.00	$204\frac{1}{2}$

* Questions marked thus (*) count double.

CHEMISTRY AND MINERALOGY.

DR. APJOHN.

1. What is the chemical formula of manganite, and of pyrolusite; and what is the weight of chlorine which an ounce of each is capable of evolving when acted upon by muriatic acid?
2. Give the reaction which occurs when a mixture of peroxide of manganese and oxalate of sodium is acted upon by sulphuric acid diluted with four volumes of water.
3. Explain the solution of silver by nitric acid, and the solution of copper by aqua regia.
4. Mention the form in which iron is generally found in chalybeate waters, the mode of detecting its presence and ascertaining its amount.
5. If a solution of a metallic salt, when acidulated with muriatic acid, gives no precipitate with sulphide of hydrogen, it must occur in one or other of three groups; what are these, and how are they distinguished from each other?
6. If a solution of a salt which has been acidulated with muriatic acid is precipitated by sulphide of hydrogen, it must occur in one or other of two groups; what are these, and how are they distinguished from each other?
7. Enumerate the leading ores of iron, copper, lead, and antimony; giving the formula and crystalline system of each. Specify also the proper solvent for each of these metals, and the forms in which they are usually estimated.
8. Native gold is an alloy; what is the second metal it includes, and how would you separate the two from each other?
9. How would you effect the analysis of a soil consisting of siliceous alumina, peroxide of iron, the carbonates of calcium and magnesium, and the chlorides of sodium and potassium,—operating separately upon the portion of the soil which dissolves, and that which is insoluble in muriatic acid?
10. Give the name and the notation of a simple form in each of the six crystalline systems, and mention minerals occurring in nature which assume such forms.

THEORY OF THE STEAM ENGINE.

MR. GALBRAITH.

1. Calculate the mechanical effect due to the evaporation of one pound of water.
2. Calculate the evaporating power of a specimen of coal from the following data:—One ton is able to convert 200 cubic feet of water at 60° into steam having a pressure of 80lbs.
3. If 5 lbs. of steam at 250° is condensed by 100 lbs. of water at 32°, what will be the temperature of the water of condensation?

4. Find the diameter of the cylinder of an engine working with low pressure steam at 100 H. P. Speed of piston 180 feet; evaporation $1\frac{1}{2}$ cubic feet; steam admitted through the whole stroke.
5. With the same data, find the diameter, the evaporation being reduced to one cubic foot, and the steam admitted through six-tenths of the stroke.
6. Find the pressure of steam in the cylinder in each of these cases.

DR. DOWNING.

1. Describe the shrunk Ordnance scale, and from its length deduce the average shrinkage of the paper employed expressed as a vulgar fraction.
2. Write down fully a statement of all the Scales that may be employed in the Parliamentary plans of a proposed railway, in all the different works required in its construction.
3. On the section now given, write down, in words and in figures, everything required by the Standing Orders for deposited plans.
4. Draw a sketch map, which may be supposed to be that of the above section, and upon it write in words and in figures all the information required by Standing Orders; part of the ground being open fields, and part continuously built upon; a portion of the line being on a curve, the remainder in right line; representing the fields and buildings so far as to show the information required by the Orders.
5. Supposing the Private Act obtained for the railway of which the above are portions, state the alterations which may be effected in the Section and in the Plan.
6. In the following railway cutting, the ground has a uniform transverse slope of 1 in 10:—

Height, 0 ft. and 17 ft.		Length, 920 ft.
" 17	" 27	" 440
" 27	" 27	" 960
" 27	" 0	" 1400

The base being 30 ft., and ratio of slopes $2\frac{1}{2}$ to 1.

Calculate the excess of this excavation above that of a cutting of the same dimensions, but with ground level transversely; and note the peculiarity of the end blocks in the case of transversely sloping ground.

7. Calculate also the excess of land required in the above work.
8. The angle of intersection of two right-lined portions of a railway centre line is 130° , and the radius of the curve connecting them is to be 25 chains; calculate the length of the "secant point," the arc, and the tangent.

WALL BIBLICAL SCHOLARSHIP EXAMINATION.

Criticism of Genesis, xxv.—xxix.

MR. LONGFIELD.

1. Ch. xxv. 18.

וַיִּשְׁכְּנוּ כַדְוִיָּה עַד שָׁר אֶת־עַל־פְּנֵי מִצְרַיִם אֶת־אֲשֶׁרָה עַל־פְּנֵי כָל־אֲדָמָי
נָפְלָה :

a. What *mater lectionis* in this verse was *not* read by the LXX.?

b. How is אֶת־אֲשֶׁרָה rendered by the LXX. and in the Peschito? The rendering of the last word of the verse in these versions is probably more correct than that of our Authorized Version?

2. Ch. xxv. 25.

וַיֵּצֵא יִשְׂמָעֵאל אֶת־מִטְוֵי כָל־אֲדָמָי שֶׁעַר יִקְרָא שְׁמוֹ עֶשֶׂר :

a. What evidence is furnished by the LXX. and Peschito as to the original state of the text of this passage?

b. The clause שֶׁעַר אֲדָמָי כָּל is rendered by the LXX. ὅλος, ὥσει δορά, δασύς. How did they arrive at this translation?

c. Translate the Peschito rendering of the same clause,

סַחֲסִי אֶת־כָּל־אֲדָמָי וְעֶשֶׂר :

What is the derivation of אֶת־כָּל־אֲדָמָי ?

3. Ch. xxvii. 27.

וַיֵּצֵא יִצְחָק וְיָרָא יִצְחָק שְׁתֵּי בָנִים כִּדְוִיָּה אֶת־בְּרִיָּה וְיָרָא בְּרִיָּה יִצְחָק :

a. In the Hebræo-Samaritan text a word is introduced which the LXX. translators also had in the text before them?

b. The same recension gives two other variants, in one of which it is supported by the Peschito?

4. Ch. xxvii. 40.

וַיִּתֵּן אֶת־הַמִּלֶּכֶת עַל־כַּף־הַיָּדָיִם וַיִּתֵּן אֶת־הַמִּלֶּכֶת עַל־כַּף־הַיָּדָיִם :

a. This passage is thus rendered by the LXX.: *ἔσται δὲ ἡνίκα ἰδὼν καθέλῃς καὶ ἐκλύσῃς τὸν ζυγὸν αὐτοῦ ἀπὸ τοῦ τραχήλου σου.* How do they seem to have read the original?

b. The following is the rendering of the Peschito :—

וְהָיָה כִּי יִשְׁכַּח אֱלֹהֵי הַשָּׁמַיִם

Translate this, and show how it was derived from the original.

c. Translate the rendering of Onkelos :

וְהָיָה כִּי יִשְׁכַּח אֱלֹהֵי הַשָּׁמַיִם וְהָיָה כִּי יִשְׁכַּח אֱלֹהֵי הַשָּׁמַיִם

d. For וְהָיָה what reading does the Hebræo-Samaritan text give, and what is the meaning of that reading?

5. a. Ἰακώβ δὲ ἄνθρωπος ἀπλαστος. xxv. 27.

b. καὶ εὗρεν ἐν τῇ ἐνιαυτῷ ἐκείνῃ ἐκατοστήουσας κριθάς.
xxvi. 12.

c. Ὁχοζάθ ὁ νυμφαγωγός. xxvi. 26.

d. δύο ἐρίφους ἀπαλούς, καὶ καλούς. xxvii. 9.

Give the Hebrew corresponding to these passages or expressions.

6. וְהָיָה כִּי יִשְׁכַּח אֱלֹהֵי הַשָּׁמַיִם וְהָיָה כִּי יִשְׁכַּח אֱלֹהֵי הַשָּׁמַיִם
אֱלֹהֵי בְנֵי רַמְבֵּד אֱלֹהֵי הַנְּבִי :

Write out this verse in the Samaritan character.

7. How does Dr. Wall seek to determine the age of the Peschito Version?

EXAMINATION FOR PRIZES IN ARABIC.

PROFESSOR MİR AULĀD ĀLĪ.

1. Why is ^{اَلْ} of the article never prefixed to a noun ending in ^{تنوين}?
 2. Why are ^ن ^ن of dual and plural dropped when the respective nouns govern the genitive case?
 3. Explain the irregularities of the Arabic numerals.
 4. Mention the forms of the intensive adjective and superlative degree.
 5. How can you distinguish a superlative degree from the comparative, since there is no difference in the form of the two?
 6. Into how many classes is the imperfect verb divided? and,
 7. What are they called in Arabic?
 8. Give in Arabic the names of the following :—The Infinitive, degrees of comparison, active and passive participles, nouns of time and place, and instrumental noun.
 9. Give the broken plurals of the following :—
^{افضل}, ^{احلى}, ^{اهل}, ^{ابيض}, ^{اسود}.
 10. What is the difference between the two terms of affirmation ^{بلى} and ^{نعم}?
 11. What various vowels can the Imperative of a verb called ^{المضاعف} take in the end?
 12. What alterations take place in the Infinitives of ^{دعى} and ^{وعد} in the primitive and derivative forms?
-

Translate into English the following passage :—

وقيل ان جعفر بن يحيى كان بينه وبين صاحب مصر
 عداوة ووحشة وكان كل منهما مجانباً للآخر ^{فـ}فزور بعض الناس
 كتاباً عن لسان جعفر بن يحيى الى صاحب مصر مضمونه ان
 حامل هذا الكتاب من اخص اصحابنا وقد آثر ^{فـ}التفرج في الديار
 المصرية فاريد ان تحسن الالتفات اليه وبالغ في الوصية ثم اخذ
 الكتاب ومضي الى مصر وعرضه علي صاحبها فلما وقف عليه
 تعجب منه وفرح به ^{لـ}الآن أنه حصل عنده ارتياب وشك في الكتاب
 فاکرم الرجل وانزله في دار حسنة واقام له ما يحتاج اليه واخذ
 الكتاب منه وارسله الى وكيله ببغداد وقال له قد وصل شخص
 من اصحاب الوزير بهذا الكتاب وقد ^{لـ}ارتبت به فاريد ان
 تتفحص لي عن حقيقة الحال في ذلك وهل هذا خط الوزير
 ام لا وارسل كتاب الوزير صاحبة مكتوبه الى وكيله فاجاء الوكيل
 الى وكيل الوزير وحدثه بالقصة واره الكتاب فاخذه وكيل
 الوزير ودخل الى الوزير وعرفه ^{لـ}الحال فلما وقف جعفر بن يحيى
 علي الكتاب علم انه مزور عليه وكان عنده جماعة من ندمائه
 ونوابه فرمي الكتاب عليهم وقال لهم اهذا خطي فتاملوه وانكروه

كلهم وقالوا هذا مزور علي الوزير فعرفهم صورة الحال وان الذي
 زور هذا الكتاب موجود بمصر عند صا حبيبها وانه ينتظر عود
 الجواب بتحقيق حاله وقال لهم ما ترون وكيف ينبغي ان
 نفعل في هذا فقال بعضهم ينبغي ان يقتل هذا الرجل حتي
 تخسّم هذه المادة ولا يرجع احد يتجراّ على مثل هذا الفعل.

FELLOWSHIP EXAMINATION.

Examiners.

HUMPHREY LLOYD, D. D., Vice-Provost.
 JOHN LEWIS MOORE, D. D.
 JAMES H. TODD, D. D., Regius Professor of Hebrew.
 ANDREW SEARLE HART, LL. D.
 JOHN TOLKEN, M. D.
 CHARLES GRAVES, D. D.
 THOMAS STACK, M. A., Regius Professor of Greek.
 JOHN H. JELLETT, M. A., Professor of Natural Philosophy.
 MICHAEL ROBERTS, M. A., Professor of Mathematics.
 JOSEPH A. GALBRAITH, M. A., Professor of Experimental Philosophy.

Mathematics, and Mathematical Physics.

DR. HART.

1. Find the polar conic of the line $ax + by + cz = 0$ with regard to a cubic given by the general equation, and hence find the condition that the line should touch the cubic.

2. If from any point A on a cubic four tangents AB, AC, AD, AE are drawn, prove that any chord through A is cut harmonically by the curve and the chords of contact BC, DE .

3. If a conic passes through five points of contact of three double tangents to a curve of the fourth degree, find its sixth intersection with these tangents, distinguishing between two cases, and finding the number of conics which belong to each case.

4. Prove that the equation

$$(x^2 + y^2 - r^2)^2 = Ax + B$$

can be reduced to the form

$$l\rho + m\rho' + n\rho'' = 0,$$

where ρ, ρ', ρ'' are the distances from three fixed points.

5. Prove that the coefficient of

$$\frac{d^2 V}{\left(d \cdot \frac{dy}{dx}\right)^2}$$

in the second variation of

$$\int \phi \left(x, y, \frac{dy}{dx} \right)$$

is a complete square, assuming the Lemmas given by Professor Jellett.

6. Show how to prove the extension of this theorem to differential functions of the second or higher orders.

7. If the differential of a given equation

$$\frac{dy}{dx} = f(x, y, c)$$

can be expressed in the form

$$\frac{d^2y}{dx^2} = \phi(x, y),$$

an integrating factor of the given equation can be immediately found.

8. Integrate the equations

$$x^3 \cdot \frac{xdy - ydx}{xdy + ydx} = F\left(\frac{x^2dx}{xdy + ydx}\right),$$

$$\frac{x}{y^2} \cdot \frac{ydx - xdy}{ydx - xdy} = F\left(\frac{y}{x} \cdot \frac{2xdy - ydx}{xdy - ydx}\right).$$

9. Apply the method of separation of symbols to find the integral of the equation

$$\frac{d^2u}{dx^2} - a^2 \frac{d^2u}{dy^2} = \frac{6u}{x^2}.$$

MR. M. ROBERTS.

1. Prove that the equation

$$\sin^2 2x \frac{d^2y}{dx^2} + y = 0$$

can be completely integrated by elliptic functions.

2. Prove the following identical relation,

$$\{(1-q)(1-q^2)(1-q^3)\dots\}^8 + 16q \{(1+q^2)(1+q^4)(1+q^6)\dots\}^8 = \{(1+q)(1+q^3)(1+q^5)\dots\}^8.$$

3. Prove from the properties of the Eulerian integrals,

$$p \int_0^1 x^{p-1} (1-x)^{q-1} dx \int_0^1 x^{p+q+r-1} (1-x)^r dx =$$

$$(p+q+r-1) \int_0^1 x^{p+q+r-2} (1-x)^r dx \int_0^1 x^p (1-x)^{q-1} dx.$$

4. Express by the Eulerian integral Γ the definite integral

$$\int_0^\infty \frac{x^{m+1} dx}{(a + \beta x + \gamma x^2)^{m+1}}.$$

5. Express by circular functions,

$$(\alpha + \beta - 1) \int_0^1 x^{\alpha-1} (1-x)^{\beta-1} dx \int_0^1 x^\beta (1-x)^{-\alpha} dx.$$

6. If $\alpha, \beta, \gamma, \delta, \epsilon$ are the roots of

$$a_0x^5 + 5a_1x^4 + 10a_2x^3 + 10a_3x^2 + 5a_4x + a_5 = 0,$$

find the value of the symmetric function

$$\Sigma (2\alpha - \beta - \gamma) (2\beta - \alpha - \gamma) (2\gamma - \alpha - \beta) (\delta - \epsilon)^2.$$

1. Find the equation of a sphere circumscribing a tetrahedron whose faces are $\alpha, \beta, \gamma, \delta$.

2. Prove that the system of ellipsoids represented by the equation

$$\frac{a^2x^2}{(a^2 - \theta^2)^2} + \frac{b^2y^2}{(b^2 - \theta^2)^2} + \frac{c^2z^2}{(c^2 - \theta^2)^2} = 1,$$

where θ is a variable parameter, is enveloped by the surface of centres of the ellipsoid

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1.$$

3. Find the equation of an ellipsoid, the origin being situated anywhere, and the axes being the normals to the three surfaces confocal with the ellipsoid which pass through the origin.

4. Prove that the vertices of two self-conjugate tetrahedra with respect to a quadric form a system of eight points, such that every quadric through seven will pass through the eighth.

5. If $U = (l \cos \theta + m \sin \theta \sin \phi + n \sin \theta \cos \phi)^2 (b^2 c^2 \cos^2 \theta + a^2 c^2 \sin^2 \theta \sin^2 \phi + a^2 b^2 \sin^2 \theta \cos^2 \phi) - a^2 b^2 c^2$,

prove that the elimination of θ and ϕ between the equations

$$U = 0, \quad \frac{dU}{d\theta} = 0, \quad \frac{dU}{d\phi} = 0,$$

leads to the same result as the condition that the following equation in t ,

$$\frac{a^2 l^2}{2a^2 - t} + \frac{b^2 m^2}{2b^2 - t} + \frac{c^2 n^2}{2c^2 - t} = t,$$

should have a double root.

6. Deduce the formula for the comparison of elliptic functions of the third kind whose form is

$$\int \frac{1}{1 + \cot^2 \theta \sin^2 \phi} \frac{d\phi}{\sqrt{1 + k^2 \sin^2 \phi}}.$$

7. Prove that in the usual notation of elliptic functions

$$\begin{aligned} E(k, \alpha) F(k, \phi) - E(k, \phi) F(k, \alpha) = \\ \cot \alpha \Delta(k, \alpha) \{ \Pi(-k^2 \sin^2 \alpha, k, \phi) - F(k, \phi) \} \\ - \cot \phi \Delta(k, \phi) \{ \Pi(-k^2 \sin^2 \phi, k, \alpha) - F(k, \alpha) \}; \end{aligned}$$

and hence show that complete functions of the third kind of both species can be expressed by functions of the first and second kinds.

8. Prove that in Jacobi's transformations all the modular equations satisfy the same differential equation of the third order.

9. If h is the modulus derived from k by the decreasing scale of Jacobi's transformation for the number 3, prove that by putting

$$k = u^4, \quad h = v^4, \quad \text{we find } 2uv(1 - u^2v^2) = u^4 - v^4.$$

10. If x, y are two elliptic integrals of the first kind whose modulus is k , prove that

$$\frac{1 - \Delta am(x) \Delta am(y) \Delta am(x+y)}{1 - \cos am(x) \cos am(y) \cos am(x+y)} = k^2.$$

DR. HART.

1. Show that the secular motions of perpendiculars to the planes of two mutually disturbing planets are nearly uniform in circular cones; and show how to find the axes of these cones.

2. State and prove a simple approximate relation which exists between the long inequalities arising from the periodic times of two planets being nearly commensurable.

3. Explain the method of integrating (for periodic perturbations of the radius vector) the equation

$$\frac{d^2(r\delta r)}{dt^2} + \frac{\mu}{r^2} \delta r = a \frac{dR}{da} + 2r \int \frac{dR}{d\epsilon} dt.$$

4. Find an expression for the variation of the mean distance of a planet moving in a resisting medium.

5. Assuming the following approximate values of the co-ordinates in the Lunar Theory,

$$\begin{aligned} u &= a \{ 1 + \epsilon \cos(c\theta - \alpha) \}, \\ u' &= a' \{ 1 + \epsilon' \cos(m\theta + \beta - \zeta) \}, \\ s &= k \sin(g\theta - \gamma), \\ \theta - \theta' &= (1 - m) \theta - \beta - 2\epsilon' \sin(m\theta + \beta - \zeta), \end{aligned}$$

find the terms in

$$\frac{P}{h^2 u^2} \quad \text{and} \quad \frac{T}{h^2 u^3}$$

which are required for a second approximation.

6. Hence compute the coefficients of the terms in the value of t which have the arguments

$$\begin{aligned} (2 - 2m) \theta - 2\beta, \\ (2 - 2m - c) \theta - 2\beta + \alpha, \\ \text{and} \quad (2 - 2m - 2c) \theta - 2\beta + 2\alpha. \end{aligned}$$

7. The equation of level surfaces of a heterogeneous rotating spheroidal fluid may be expressed in the form

$$\frac{\text{Potential}}{(\text{radius vector})^2} = AP_0 + BP_2;$$

determine the second member of the equation as a function of the latitude which satisfies the equation of Laplace's coefficients.

8. Hence assuming

$$r = a' \{ 1 + a \Sigma (Y_i) \}$$

$$v = \frac{4\pi}{r} \int_0^{a'} \rho \left\{ a^3 + a \frac{d}{da} \cdot \Sigma \left(\frac{a^{i+3}}{(2i+1)} r^i Y_i \right) \right\} da$$

$$+ 4\pi \int_a^b \left\{ a + a \frac{d}{da} \cdot \Sigma \left(\frac{r^i}{(2i+1)} a^{i-2} Y_i \right) \right\} da,$$

determine the values of the coefficients Y_i .

9. Compute the attraction of such a spheroid on a distant body, *e. g.* that of the Earth on the Moon.

PROFESSOR JELLETT.

10. Show that the equation for the nutation will be of the form

$$\frac{d\theta}{dt} = A \sin(2\phi + it + \epsilon) + B \sin(2\phi - it - \epsilon) + C \sin(it + \epsilon),$$

corresponding to a term in the motion of the disturbing body whose argument is $it + \epsilon$, and determine the values of A , B , C .

a. In general the obliquity of the ecliptic is affected only by long inequalities in the motion of the disturbing body. It is possible, however, to conceive a short inequality not greater in amount, which, if it existed, would produce a perceptible effect?

11. Enunciate and prove the rule for deducing the obliquity of the apparent ecliptic from that of the fixed ecliptic.

a. Laplace states that the secular variation of the obliquity of the apparent ecliptic is the same for a spherical as for a non-spherical Earth for times near the epoch. Enunciate this proposition so as to give it a real meaning independent of the arbitrary word "epoch".

12. Define the mean day, and determine the inequality in its length corresponding to a term in the precession or nutation whose argument is $ft + \beta$.

a. Show that this inequality will nearly vanish if the motion of precession be very rapid in comparison with the motion of the Earth's orbit.

13. If a cylinder partly roll and partly slip down an inclined plane, the axes of the cylinder being parallel to the intersection of the inclined plane with the plane of the horizon;

a. Show that the motion is a pure rotation, and determine the instantaneous axis at any time, being given the initial circumstances of the motion.

b. If, at any period of the motion, the instantaneous axis be without the cylinder, it can never at any subsequent period be within it?

1. A material particle is acted on by forces which satisfy the criterion

$$Xdx + Ydy + Zdz = dv,$$

and is projected from a given point with a given velocity, so as to pass through another given point. If there be several different trajectories

which satisfy this condition, and if they be arranged according to the magnitude of their angles of projection, measured from the same line, no two consecutive trajectories will satisfy the principle of least action?

a. If two consecutive trajectories cut each other between the central and terminal points, the principle of least action does not hold for either?

b. No two trajectories drawn under such conditions can touch each other?

2. If a number of particles be attached to an inextensible thread, and if it be supposed that each particle is acted on by a given force, prove by the method of Lagrange that the equations of their motion are

$$\frac{d^2x}{dt^2} Dm + \frac{\partial \Pi}{\partial x} Dm - D \left(T \frac{Dx}{Ds} \right) = 0$$

$$\frac{d^2y}{dt^2} Dm + \&c. = 0$$

$$\frac{d^2s}{dt^2} Dm + \&c. = 0$$

a. Show from the meaning of these equations that they might at once be written down.

3. If the movements of the particles be very small, Lagrange reduces these to a system of equation of mixed differences. Deduce these equations.

a. Describe the method by which Lagrange solves these equations.

4. The equilibrium of a continuous system of particles acted on by forces which satisfy the criterion in (1) is reducible to a problem of maxima or minima; prove this for the case of a superficial system.

a. Understanding by the term *maximum* a value which, irrespective of its sign, exceeds all values immediately adjoining, this problem is never one of a maximum?

b. It is necessary for the truth of this reduction that the potential of the given forces should retain the same sign throughout the system?

5. Show that a homogeneous revolving fluid acted on only by the attractions of its own particles is capable of one, and but one, spheroidal figure of equilibrium, corresponding to any originally impressed amount of motion.

6. In a homogeneous ellipsoid with three unequal axes, show that the acute angle which the normal at any point makes with the greatest axis is greater than the acute angle which the resultant attraction at the same point makes with the same axis.

a. Assuming the truth of this theorem, show that the figure of equilibrium of a revolving fluid could not be an ellipsoid whose greatest axis is the axis of revolution.

7. Deduce from the general equation of *surfaces de niveau*, sc.

$$\begin{aligned} \int \frac{d\Pi}{\rho} &= 2\pi \int_a^1 \rho d. a^3 + 4a\pi \int_a^1 \rho d. a^2 \Sigma \frac{Y_n r^n}{(2n+1) a^n} \\ &+ \frac{4\pi}{3r} \int_0^a \rho d. a^3 + \frac{4a\pi}{r} \int_0^a \rho d. a^2 \Sigma \frac{Y_n a^n}{(2n+1) r^n} \\ &+ ar^2 (Z_0 + Z_2 + rZ_3 + \&c.) \end{aligned}$$

the differential equation for the n^{th} Laplacian coefficient.

a. Show how to determine the arbitrary constants in the solution of this equation, for the case of a fluid surrounding a solid nucleus.

b. In this determination Laplace assumes that the surface of the nucleus is a *surface de niveau* of the fluid. It is easy to conceive a case of equilibrium in which this would not be true?

c. For the truth of the equation given above, it is necessary that the nucleus should either consist wholly of strata, or should be formed from such a nucleus by additions from the surrounding fluid solidified without change of density?

8. Prove, as Gauss does, that the normal attraction of a surface changes twice by the quantity $-2\pi k$, as the attracted point passes from one side of the surface to the other.

9. Show that there is always a mode of distribution on a closed surface which will render the potential of the mass so distributed constant for all internal points.

10. If a beam of polarized light be transmitted successively through a Fresnel's rhomb, a plate of Iceland spar, and an analyzer, what is the expression for the final intensity?

11. Prove, as Professor M'Cullagh does, that if the luminiferous ether be such a medium as he assumes it to be, the equations of a system of transversal vibrations will be

$$\frac{d^2\xi}{dt^2} = s^2 \frac{d^2\xi}{dz^2}, \quad \frac{d^2\xi}{dt^2} = s'^2 \frac{d^2\xi}{dz'^2}.$$

a. Show that this medium is incapable of transmitting a wave consisting of normal vibrations.

12. How does Lamé reduce the constant coefficients in the values of the elastic forces from thirty-six to eight for the case of a homogeneous uncrystalline body; and how are these further reduced to three by the consideration of the particular cases of compression and torsion.

Experimental Physics.

ELECTRICITY AND MAGNETISM.

DR. LLOYD.

1. What are the difficulties in experimenting on the conductivity of Liquids, and how are they overcome?

2. Describe the method proposed by Ohm in order to determine experimentally the electromotive forces, and the resistances, of the cells of a voltaic pile.

3. Describe M. J. Regnault's method of measuring the electromotive forces of different voltaic combinations.

4. Explain the steps of M. Pouillet's calculation of the electromotive force of the thermo-electric couple in absolute units, and give the numerical results.

5. Find the expression for the "index of sensibility" of a multiplier, in terms of the length and section of the coil, and of the conductivity of the wire; and deduce the number of turns which will give the maximum of sensibility.

6. The current of a thermo-electric pile traverses a galvanometer; deduce the expression for the deviation of the needle, the resistance of the pile being negligible.

7. A horizontal free magnet is acted on by a vertical conductor; find the direction and intensity of the force which produces a movement of translation of the magnet, and construct it geometrically.

8. In Ampère's formula for the reciprocal action of two elementary currents, how is the law of the force as dependent on the distance determined? Give the principal steps of the deduction.

9. A magnet acts upon a magnetic particle, whose distance is considerable compared with the length of the magnet; find the relation between the forces in the direction of the line connecting the magnetic particle with the centre of the magnet, and in the direction of the axis of the magnet.

10. Show by what means the "magnetic curve" may be mechanically constructed.

11. In Coulomb's method of determining the law of magnetic action by means of the torsion-balance, find the expression for the force between the acting poles.

12. In long magnetized wires of the same diameter, the magnetic moments are proportional to the lengths; how does this follow from the laws of magnetic distribution observed by Coulomb?

13. By what means are the magnetic powers of liquids compared by M. Becquerel?

14. A magnetic needle moves in any vertical plane on a horizontal axis; deduce the equation of equilibrium of the needle under the combined influence of magnetism and gravity.

15. One magnet is employed to deflect another at three known distances, the deflecting magnet being perpendicular to the suspended magnet, and the direction of its axis passing through the centre of the latter; prove that the ratio of the Earth's magnetic force to the magnetic moment of the deflecting magnet is given by the equation

$$\frac{m}{X} \left(\frac{\rho_2 - \rho_3}{\rho_1} + \frac{\rho_3 - \rho_1}{\rho_2} + \frac{\rho_1 - \rho_2}{\rho_3} \right) = A_1 \frac{\rho_2 - \rho_3}{\rho_1} + A_2 \frac{\rho_3 - \rho_1}{\rho_2} + A_3 \frac{\rho_1 - \rho_2}{\rho_3};$$

ρ_1, ρ_2, ρ_3 denoting the reciprocals of the squares of the three distances, and A_1, A_2, A_3 the corresponding values of $\frac{1}{2} r^3 \sin u$, u being the angle of deflection.

THEORY OF HEAT.

MR. GALBRAITH.

1. Investigate the law by which the temperature varies in a homogeneous solid bounded by parallel planes, each of which is maintained at a constant temperature, regard being had to interior conduction only.

2. Investigate the law of temperature in a prismatic homogeneous bar of indefinite length, whose extremity is exposed to the action of a constant source of heat; and describe Despretz' method of comparing the conducting powers of different metals.

3. Prove the following relation between the pressure, density, and temperature of a gas:—

$$p = \frac{587.7}{\text{sp. gr.}} \times \rho (1 + 0.00366 t),$$

in which p is the pressure in meters of mercury, and ρ the density referred to water.

4. Investigate the laws of elastic force and temperature of gases, compressed or dilated without any variation in their quantity of heat, and prove that

$$\frac{p'}{p} = \left(\frac{\rho'}{\rho} \right)^\gamma,$$

$$\frac{T'}{T} = \left(\frac{\rho'}{\rho} \right)^{\gamma-1},$$

in which γ is the ratio of the specific heats under constant pressure and constant volume, and T, T' the temperatures measured from the absolute zero.

5. Prove that the external work done by the evaporation of a pound of any liquid is expressed as follows:—

$$\text{Work done in foot-pounds} = \frac{53.3}{s} (460 + t),$$

in which s = specific gravity of the vapour of the liquid.

6. If a pound of Ether and a pound of Water be raised from the temperature of melting ice, and then converted into vapour at their respective boiling points, calculate the external work done in each case for each unit of heat expended—

Specific gravity of vapour of ether	= 2.586
Specific heat	= 0.500
Boiling point	= 100°
Latent heat	= 164

LIGHT.

PROFESSOR JELLETT.

1. A mixture of two fluids possessed of opposite rotatory powers is found to be left-handed for red light, and right-handed for blue light; explain this phenomenon.

2. If a ray of polarized light be refracted at a single surface, the change in the plane of polarization is expressed, according to the theory of Fresnel, by the equation

$$\frac{\tan \beta}{\tan \beta'} = \cos (i - r).$$

If this equation be true, the transition from one medium to another must be abrupt, and not by any continuous change of density, however rapid?

a. If it be required to determine the index of refraction of a substance by the change which it produces in the plane of polarization of a refracted ray, what is the most advantageous position for the plane of polarization of the incident light?

b. How might it be shown experimentally that a continuous change of density does not give any change in the plane of polarization?

3. In determining the position of the plane of polarization of a given ray, it is necessary in the first place to know the position of the plane for some one ray, the polarizer being a Nicol's prism: *e.g.*, if the polarizer and analyzer be mounted on arms capable of moving in a vertical circle, show how to determine the position of the polarizer which will give a ray polarized in the plane of this circle.

4. Two rays polarized in opposite planes, and then reduced to the same plane, will interfere, if they originally belonged to one plane-polarized pencil; how is this experimentally proved?

5. The expressions given by Herschel and Airy, respectively, for the intensity of the transmitted light in the case of the phenomena of thin plates, are:—

$$1 - 4e \sin^2 \frac{2\pi t}{\lambda} \quad \text{and} \quad \frac{(1 - e^2)^2}{(1 - e^2)^2 + 4e^2} \sin^2 \frac{2\pi t}{\lambda};$$

the incidence being perpendicular, and e being the coefficient by which the incident vibration is multiplied to obtain the reflected vibration. Taking the value of e given by the theory of Fresnel, and using homogeneous light, it is easy to imagine an *experimentum crucis* between these expressions, if the glass used be highly refracting?

a. What is the origin of the difference between these values?

Classics.

DR. GRAVES.

Translate the following passages accurately into English:—

- Beginning*, Τοῦ φέρον ἐμπλήσας ἀσκὸν μέγαν· ἐν δὲ καὶ ἦϊα, κ. τ. λ.
Ending, Οὐδ' ἄρ' ἐμελλ' ἐτάροισι φανεῖς ἐρατεινὸς ἔσσειθαι.
HOMER, *Odyssey*, lib. ix. 212–230.
- Beginning*, 'Ορμᾶται μόλις, ἀλλ' ὅμως, κ. τ. λ.
Ending, Εὐδαίμων, μακαρίζω.
EURIPIDES, *Bacchæ*, 882–911.
- Beginning*, Φέρε δὴ σοι, ἐὰν δύνωμαι, κ. τ. λ.
Ending, ἐθίλω ὑποσχεῖν λόγον.
PLATO, *Gorgias*, 44–45.
- Beginning*, Πολλῶν ὧ ἄνδρες Αθηναῖοι, κ. τ. λ.
Ending, ἐὰν μὴ τὸν ἱκέτην ἐκδοτον διδῶσιν.
DEMOSTHENES, *Contra Aristocrates*, 83–85.

MR. STACK.

Translate the following passages accurately into English :—

1. *Beginning*, Καὶ ταῦτα ἡ ἐμὴ νεότης καὶ ἄνοια παρὰ φύσιν, κ. τ. λ.
Ending, λογῶ ἀλλ' ἐργῶ μᾶλλον ξυνήθεις ἔξειν.
 THUCYDIDES, vi. 17. 18.
2. *Beginning*, δὸς τυχὰς εὖ τυχεῖν κυρίως, κ. τ. λ.
Ending, συμμαχὸν καλεῖ Δικην.
 ÆSCHYLUS, *Choeph.*, 772—820.
3. *Beginning*, σὺ δὲ λαμπαδί φεγγων, κ. τ. λ.
Ending, ἀλλ' ἡ Διὸς Κόρινθος ἐν τοῖς στρωμασιν.
 ARISTOPHANES, *Rau.*, 350—440.
4. *Beginning*, ἂ μοῖσα γὰρ οὐ φιλοκερδὴς πῶ τοτ' ἦν οὐδ' ἐργατὶς, κ. τ. λ.
Ending, ἐν δὲ χειμῶνι πλεων Νείλου πρὸς ἀκτὰς.
 PINDAR, *Isth.* II.

DR. GRAVES.

Translate the following passages accurately into English :—

1. *Beginning*, Motibus astrorum nunc quæ sit causa canamus.
Ending, Præcipere haut quaquamst pedetentim progredientis.
 LUCRETIVS, *De Rer. Nat.*, v. 509—533.
2. *Beginning*, Inde pater Divûm, sancta cum conjuge, natisque.
Ending, Carmine, perfidiæ quod post nulla arguet ætas.
 CATULLUS, *Carm.*, lxi. 299—323.
3. *Beginning*, Vicit et hoc monstrum tunicati fuscina Gracchi,
Ending, Non faciunt illi, quos vicimus.
 JUVENAL, *Sat.* ii. 143—163.
4. a. *Beginning*, Neminem qui cum potestate aut legatione.
Ending, quum venditori suo arbitrato vendere non liceret.
 CICERO, *In C. Verrem*, Act II. lib. iv. s. 5.
- b. *Beginning*, Ex ebore diligentissime perfecta argumenta.
Ending, etiam id concupisti ?
Ibid., lib. iv. s. 57.

MR. STACK.

Translate the following passages accurately into English :—

1. *Beginning*, Sexto demum consulatu Cæsar Augustus,
Ending, modicum in præsens levamentum fuere.
 TACITUS, *Ann.* iii. 28.
2. *Beginning*, Interea magna vis accusatorum in eos inrupit,
Ending, ut ferme talia, initiis, incurioso fine.
Ibid., *Ann.* vi. 16, 17.

3. *Beginning*, Scito C. Sempronium Rufum,
Ending, Recte hoc par habet.

CICERO, *Ep. ad Div.*, viii. 8.

Translate the following passage into Greek Prose :—

The idea of representation was unknown in ancient times. When the people of one state were admitted to the right of citizenship in another, they had no other means of exercising that right but by coming in a body to vote and deliberate with the people of that other state. The admission of the greater part of the inhabitants of Italy to the privileges of Roman citizens, completely ruined the Roman republic. It was no longer possible to distinguish between who was and who was not a Roman citizen. No tribe could know its own members. A rabble of any kind could be introduced into the assemblies of the people, could drive out the real citizens, and decide upon the affairs of the republic as if they themselves had been such. But though America were to send fifty or sixty new representatives to Parliament, the door-keeper of the House of Commons could not find any great difficulty in distinguishing between who was and who was not a member. Though the Roman constitution, therefore, was necessarily ruined by the union of Rome with the allied states of Italy, there is not the least probability that the British constitution would be hurt by the union of Great Britain with her colonies. That constitution, on the contrary, would be completed by it, and seems to be imperfect without it. The assembly which deliberates and decides concerning the affairs of every part of the empire, in order to be properly informed, ought certainly to have representatives from every part of it. That this union, however, could be easily effectuated, or that difficulties and great difficulties might not occur in the execution, I do not pretend. I have yet heard of none, however, which appear insurmountable. The principal, perhaps, arise not from the nature of things, but from the prejudices and opinions of the people both on this and on the other side of the Atlantic.—ADAM SMITH.

DR. GRAVES.

Translate the following passage into Greek Hexameters :—

He spoke; and Sohrab kindled at his taunts,
 And he too drew his sword: at once they rush'd
 Together, as two eagles on one prey
 Come rushing down together from the clouds,
 One from the east, one from the west; their shields
 Dash'd with a clang together, and a din
 Rose, such as that the sinewy woodcutters
 Make often in the forest's heart at morn,
 Of hewing axes, crashing trees: such blows
 Rustum and Sohrab on each other hail'd.
 And you would say that sun and stars took part
 In that unnatural conflict; for a cloud
 Grew suddenly in Heaven, and dark'd the sun

Over the fighters' heads ; and a wind rose
Under their feet, and moaning swept the plain,
And in a sandy whirlwind wrapp'd the pair.
In gloom they twain were wrapp'd, and they alone ;
For both the on-looking hosts on either hand
Stood in broad daylight, and the sky was pure,
And the sun sparkled on the Oxus stream.
But in the gloom they fought, with bloodshot eyes
And labouring breath ; first Rustum struck the shield
Which Sohrab held stiff out : the steel-spik'd spear
Rent the tough plates, but fail'd to reach the skin,
And Rustum pluck'd it back with angry groan.
Then Sohrab with his sword smote Rustum's helm,
Nor clove its steel quite through ; but all the crest
He shore away, and that proud horsehair plume,
Never till now defil'd, sunk to the dust ;
And Rustum bow'd his head ; but then the gloom
Grew blacker : thunder rumbled in the air,
And lightnings rent the cloud ; and Ruksh, the horse,
Who stood at hand, utter'd a dreadful cry :
No horse's cry was that, most like the roar
Of some pain'd desert lion, who all day
Has trail'd the hunter's javelin in his side,
And comes at night to die upon the sand :—
The two hosts heard that cry, and quak'd for fear,
And Oxus curdled as it cross'd his stream.

ARNOLD.

Translate the following passage into Latin Prose :—

Translation is a kind of drawing after the life ; where every one will acknowledge there is a double sort of likeness, a good one and a bad. It is one thing to draw the outlines true, the features like, the proportions exact, the colouring itself perhaps tolerable ; and another thing to make all these graceful, by the posture, the shadowings, and chiefly by the spirit which animates the whole. I cannot, without some indignation, look on an ill copy of an excellent original ; much less can I behold with patience Virgil, Homer, and some others, whose beauties I have been endeavouring all my life to imitate, so abused, as I may say, to their faces by a botching interpreter. What English readers, unacquainted with Greek or Latin, will believe me or any other man, when we commend these authors, and confess we derive all that is pardonable in us from their fountains, if they take those to be the same poets whom our Oglebies have translated ? But I dare assure them that a good poet is no more like himself in a dull translation, than his carcass would be to his living body. There are many who understand Greek and Latin, and yet are ignorant of their mother-tongue. The proprieties and delicacies of the English are known to few ; it is impossible even for a good wit to understand and practise them without the help of a liberal education, long reading, and digesting of those few good authors we have amongst us ; the knowledge of men and manners, the freedom of habitudes and conversation with the best company of both sexes ; and, in short, without

wearing off the rust which he contracted while he was laying in a stock of learning. .

Thus it appears necessary that a man should be a nice critic in his mother-tongue before he attempts to translate in a foreign language. Neither is it sufficient that he be able to judge of words and style, but he must be a master of them too : he must perfectly understand his author's tongue, and absolutely command his own : so that to be a thorough translator, he must be a thorough poet. Neither is it enough to give his author's sense, in good English, in poetical expressions, and in musical numbers ; for, though all these are exceeding difficult to perform, yet there remains a harder task ; and it is a secret of which few translators have sufficiently thought. I have already hinted a word or two concerning it ; that is the maintaining the character of an author, which distinguishes him from all others, and makes him appear that individual poet whom you would interpret. For example, not only the thoughts but the style and versification of Virgil and Ovid are very different ; yet I see, even in our best poets, who have translated some parts of them, that they have confounded their several talents ; and by endeavouring only at the sweetness and harmony of numbers, have made them both so much alike, that if I did not know the originals, I should never be able to judge by the copies which was Virgil and which was Ovid. It was objected against a late noble painter, that he drew many graceful pictures, but few of them were like. And this happened to him, because he always studied himself more than those who sat to him. In such translators I can easily distinguish the hand which performed the work, but I cannot distinguish their poet from another.—**DRYDEN.**

MR. STACK.

Translate the following passage into Latin Alcaic Verse :—

Prophet of God, arise and take
 With thee the words of wrath divine,
 The scourge of Heaven to shake
 O'er yon apostate shrine.
 Where Angels down the lucid stair
 Came hovering to our sainted sires,
 Now, in the twilight, glare
 The heathen's wizard fires.
 Go, with thy voice the altar rend,
 Scatter the ashes, be the arm,
 That idols would befriend,
 Shrunk at thy withering charm.
 Then turn thee, for thy time is short,
 But trace not o'er the former way,
 Lest idol pleasures court
 Thy heedless soul astray.
 Trust not the dangerous path again—
 O forward step and lingering will !
 O loved and warned in vain !
 And wilt thou perish still ?

The grey-haired saint may fail at last,
 The surest guide a wanderer prove;
 Death only binds us fast
 To the bright shore of love.

KEBLE.

ANCIENT HISTORY.

DR. GRAVES.

The Candidates are required to discuss the following questions in the form of short Essays:—

1. On the causes of the backwardness of the Romans in the pursuit of Science and Art.
2. On the influence of the Roman Religion on the national character; distinguishing its effects in the earlier and later periods.
3. On the leading features in the educational systems of Greece.

MR. STACK.

1. Write a detailed statement of the result in its various fields of development of the combination *inter se* of the Greek and Roman Nationalities in the seventh century v. c.
2. Give an account of the monetary system of the Romans as it was established in the seventh century v. c., and point out its political importance and its political results.
3. Write a short Essay on the several forms which the Federal principle assumed among the Greeks, and on the circumstances which made it especially suitable to the Greek character.

Write brief Essays on the following subjects:—

1. On the elements for the solution of the problems of language which are derived respectively from the ancient and from the modern languages.
2. On the effect of writing and the progress of literature on the structure of language.
3. On the various theories as to the origin of *roots* in language.
4. On the causes and progress of phonetic change.
5. On the different theories of the mythology of the Greeks.
6. On the principles of Derivation and Composition in the Greek and Latin languages.

Hebrew and Chaldee.

DR. TODD.

1. Origen, in his "Hexapla," writes a passage of Hebrew in Greek letters thus: Ουθωσε ἀραις δεσα, ἰσεβ μαξαρει ξαρα λαμινειου ούεζ ωσε φερει. Restore this to its original Hebrew characters, and show how the present vocalization differs from that of Origen.

2. Give some account of the following attempts of the Jews at a critical recension of the text:—

(a). The חז"ל לא קרי and קרי לא חז"ל.

(b). The עמור ספרים.

(c). The חקק ספרים.

(d). The collections of various readings called the "Discrepancies of the Oriental and Western Jews," and the "Discrepancies of Ben Ascher and Ben Napthali"—Explain here (a) the history, authors, and subject matter of these two collections; (b) their probable date; (c) their bearing on the controversy about the antiquity of the vowel points.

3. Translate the following passage from R. David Kimchi's preface to his Commentary on the Psalms, and make such remarks upon it as may occur to you:—

אמר רוד בן יוסף קמחי הספדי אמר רבותינו ז"ל כי רוד מלך ישראל כתב ספר על ידי עשרה זקנים ואלו הם אדם הראשון מלכי צדק אברהם אסף הימני ירחוקי משה ושלשה בני קרח אסיר ואלקנה ואביאסף רצונו לומר כי אלו העשרה אמרו המזמורים הנחובים בשמם ואמרו כי מזמור שיר ליום השבת אדם הראשון אמר שנברא בשבת ונשבת השנים ואמר מזמור שיר ליום השבת ואמר ז"ל איתן האחד זה אברהם אבינו ואמר כי מזמור נאם ה' לאדני מלכי צדק אמר והשאר מפורשים הם בשמם ואמר מה משה רבינו חלק ספר תורה לחמשה ספרים כך רוד חלק ספר תהלים לחמשה ספרים

4. Enumerate—1. The accents whose names are derived from their powers, or grammatical functions. 2. Those whose names are derived from their forms, or figures.

5. Give the figures of the following accents:—Silluk; Athnach; S'golta; Zakeph Katon; Zakeph Gadol; Tiphcha; Rebhia; Zarka; Pashta; Tebhira; Yethibh; Shalsheth; Pazer; Karne Phara; Telisha gedolah; Geresh; Gereshaim; Pesik; Munach; Mahpach; Kadma; Darga; Telisha Ketanna; Mercha; Mercha Cephula; Yerahh ben yomo.

6. Write the foregoing names in Hebrew characters, and explain their etymology and signification.

7. How is Pashta distinguished from Kadma; Yethibh from Mahhpach; Rebhia from Cholem?

8. Enumerate (a) the accents common to the poetical and prose books; (b) the accents peculiar to the three poetical books; (c) Shalshleth and Tiphcha have a different force in the prose and poetical books?

9. The double accent, Mercha Mahpachatum, has also another name? Explain its use as a stop.

10. The names Munach, Yethibh, and Mahhpach are adjectives; what substantive is understood?

11. The accent called Legarmeh is of two kinds? The meaning and root of the name?

12. How is Shalshleth written when it is disjunctive, and how when it is conjunctive?

13. Give the names of the accents and analyze their several uses, as marking the logical or grammatical divisions of the sentence, in the verse—

הָיָה בַּעֲץ לְשֹׁהַל עַל-פְּלִי מִים אֲשֶׁר פָּרְיוֹ יִהְיֶה בַּעֲתוֹ וְעָלָהּ לֹא יָבֹל וְכֹל
אֲשֶׁר-יֵשֶׁה יִצְלַח :

14. Translate the following Psalm:—

לִדְוֹ מִזְמוֹר חֲדָשׁ וּמִשְׁשׁ אֲשִׁידָה לְךָ יְהוָה אֱלֹהֵי : אֲשַׁכִּילָה בִּדְרוֹךְ הַמִּים מִדֵּי הַנּוֹא
אֵלַי אֲחֻזָּךְ בְּחַסְדְּךָ בִּקְרֵב בִּיחִי : לֹא-רָאִיתִי לִגְדִּי עֵינַי דֹּבֵר-בְּלִיעַל עֲשֵׂה-סִמִּים שְׂמֹאנִי לֹא
דָּבַק בִּי : לִבִּי עָקַשׁ יִסּוֹר מִמֶּנִּי רַע לֹא אָרַע : מְלוֹשְׁנִי בִסְתֵר רַעוּזוֹ אֲצַמִּית
גְּבוּהַ עֵינַי וְרוּחַ לִבִּי אֲחוֹ לֹא אֲוִיל : עֵינִי בְּנִאמְרֵי-אֲרָץ לִשְׁבֹּחַ עַמִּדִּי הֵלֶךְ בִּדְרוֹךְ הַמִּים
הוּא יִשְׂרָחֵנִי : לֹא-יֵשֵׁב בִּקְרֵב בִּיחִי עֲשֵׂה רַמְדָּה דֹּבֵר שִׁקְרִים לֹא-יִכְנֹן לִגְדִּי עֵינִי : לִבְקִרִים
אֲצַמִּית כִּלְשֵׁי-אֲרָץ לֹחֲרִית מַעֲדִי-יִהְיֶה כִלְשָׁעִלִי אֵין :

(a). From the last verse, Michaelis, Rosenmüller, and others endeavour to determine the date of the Psalm?

(b). Explain the phrase עֲשֵׂה סִמִּים שְׂמֹאנִי, and parse; the word סִמִּים occurs elsewhere in a different spelling? Its root and primary meaning?

(c). Ver. 5. Explain the grammatical difference between מְלוֹשְׁנִי in this verse, as it is in the text, and מְלֹשֶׁן, the Keri. Account for the Kametz under ל, and the final י.

(d). The LXX. render the words אֲחוֹ לֹא אֲוִיל by *τούτω οὐ συνήθιστον*; They must have had a different pronunciation? The Masoretic punctuation implies an ellipsis?

15. Translate the following passage from the Chaldee paraphrase on Ps. cii. 26-28:—

מִן שִׁירָא דְאַתְרֵיזָא כִּל בְּרִיתָא אֲרֵשָׁא יִסְרָאֵל וְעֹבְדֵי אֱלֹהֵיךָ לְסִמְיָא: הֲנֵן
יְהוֹבָדִין וְאֵת הַקִּדִּים וְכֹלְהוֹן הֵךְ לְבָשָׂא יִתְבָּלֵן הֵךְ אֲצִילֵי הַחֲלָמֵן וְהַחֲלָמֵן:
וְאֵת הָאָה דִּי בְרִיתָא וְשִׁנְתָּהּ לֹא כְּשִׁתְּלֵמִין:

Mental and Moral Sciences.

DR. TOLEKEN.

1. State exactly the meaning of the word "noumenon" as defined by Kant, and show that it is not an arbitrary or fictitious notion.

In what sense may we say that the understanding represents things as they are?

The supposition of an "Intuitive Understanding" would introduce important modifications into philosophy?

2. Explain what Kant means by the "Understanding" and the "Reason," and distinguish the corresponding Logical and Transcendental applications of each.

Show—(α) That the whole of Logic must depend on the Transcendental Unity of Apperception.

(β) That the Understanding cannot supply principles properly so called.

(γ) That the highest fundamental principle of pure Reason is synthetic.

3. Give a summary of Kant's investigation respecting the possibility of a canon of pure Reason. What questions only does he state properly to belong to it, and why?

How is practical Freedom described in the "Critick"? and with what is it contrasted, and how? What purely speculative questions does Kant mention in connexion with this subject?

4. Under what head does Hegel treat of the determinations of Reflection, and to what step in the Phenomenology do they correspond? State the chief of these relations, and explain what Hegel means by Identity, Phenomenon, and Actuality, with the transition from the latter to the Conception.

5. Sir W. Hamilton notices a difference between the nomenclature of the objects and affections of Vision and those of the other senses, and mentions an important difficulty in Philosophy which he thinks may be removed by this observation?

A fact assumed in his explanation has been denied by later writers?

6. Mr. Abbott concludes from the special nature of the sense of Sight as contrasted with that of Touch, as well as from the nature of its perceptions, that an intuition of Space properly belongs to it?

Sir W. Hamilton and Mr. Abbott both argue from what the latter terms the visual perception in its most independent form ; how do they differ ?

Mr. Abbott admits association as an element in our comparison of visual distances ?

7. That the admission of a community of Nature in the case of Mind and Matter would not of itself be sufficient to remove the difficulties in explaining Perception, appears from the theory of a celebrated English Metaphysician quoted by Hamilton ?

Hamilton's own explanation leaves this difficulty unresolved ?

To what does Kant reduce the question as to the reciprocal influence of Mind and Body ?

8. How does Mr. Mansel differ from other authors in his mode of explaining the existence of Necessary and Contingent Truths, and of applying the principles of Universality and Necessity ? Point out the difficulty of distinguishing accurately between these tests, and give Mr. Mill's criticism of Mr. Spencer's views on the subject.

9. State fully Mr. Mill's explanation of the import of Propositions, and show that it naturally led to his views respecting Axioms, Reasoning, and Syllogism, and perhaps to his original error respecting the theory of Probabilities.

10. Give some account of the Logic of Hobbes, with Mr. Mansel's criticism. Compare his theory of Judgments with those of Kant, Hegel, and Mr. Mansel ; and show that the accusation commonly brought against his Logic is without foundation.

DR. MOORE.

1. Locke advances two distinct theories to prove Ethics to be capable of demonstration. Give these, and state how far you consider his own determinations in Natural Theology and Morals to be tenable.

(a). Butler remarks the peculiar nature of our Moral Ideas, and gives instances of confusion and perplexity in this Science ?

2. What origin of Civil Society does Cicero assign ? and compare his theory with that of Warburton.

(a). *Jus gentium*, and its sanctions, according to Cicero ?

3. Warburton classifies the ancient theories of moral obligation in reference to modern opinions on the same subject ; discuss the propriety of his classification.

4. State accurately the definitions of Virtue as given by the following writers—Clark, Hutchinson, Hume, Shaftesbury, and Hobbes.

(a). Write a short note on each, marking its merit and demerit.

5. All the ancient systems de summo bono, as expounded by Cicero, set out from the same principle, and subject their conclusions to a common criterion.

6. State the Stoical paradoxes on the following subjects, and show how they follow *logically* from their system—de felicitate, de amicitia, de perturbationibus ?

(a). How far do the Stoics agree among themselves as to these paradoxes ?

7. How does Cicero arrive at the principle, which he says "quibusdam incredibile videatur," "ut nihilo sese plus, quam alterum diligat."

(a). With what limitation was this principle asserted?

8. Explain the following passage, N. E., lib. 6th :—Αἱ μὲν ἀρχαὶ τῶν πρακτῶν τοὺ ἐνεκα τὰ πρακτά; and mention the different senses in which the word *Ἀρχή* is used in the Nic. Ethics.

9. Examine Mr. Hume's objection to the argument *a posteriori* for the existence of the Deity.

(a). The ambiguity of the word cause has obscured this argument; how?

10. State how the Stoic in the "de Natura Deorum" gives this argument?

(a). Explain Cotta's answer to the Stoical argument.

11. Swegler asserts that Aristotle having taken his conceptions of the virtues from language, his enumeration is uncertain and various; discuss this criticism.

12. The term "Virtus," as used by Cicero, varies in its extension, and accordingly the word has different definitions; give examples of this.

SCHOLARSHIP EXAMINATION.

Science Scholarships.

Examiners.

THOMAS LUBY, D. D.

ANDREW SEARLE HART, LL. D.

JOHN H. JELLETT, M. A., Professor of Natural Philosophy.

MICHAEL ROBERTS, M. A., Professor of Mathematics.

JOSEPH A. GALBRAITH, M. A., Professor of Experimental Philosophy.

GEOMETRY.

DR. HART.

1. Two right lines pass each through a given point, and intercept a segment of given length on a given line; find the locus of their intersection.

2. If α, β, γ are the distances of a point from the sides of a given triangle A, B, C , find its distance from the right line which passes through the intersections of the sides with the bisectors of the external angles.

3. Prove that the sum of the perpendiculars from any point on the sides of a given equilateral or equiangular polygon is constant.

4. Find the equation of the line which passes through the feet of perpendiculars on the sides of a given triangle from a point on the circumscribing circle.

5. Find the locus of the intersection of a tangent to a conic with the line drawn from the focus to the point of bisection of the corresponding normal.

6. Prove that chords of a conic which touch a given confocal conic are proportional to the parallel focal chords.

7. Prove that the trilinear equation

$$a^2 \sin 2A + \beta^2 \sin 2B + \gamma^2 \sin 2C = 2 (\beta\gamma \sin A + \gamma\alpha \sin B + \alpha\beta \sin C)$$

represents a circle.

8. Find the locus of the intersection of tangents to a conic which intercept a segment of given length on a given tangent.

9. If two conics have double contact, and if four chords of the first touch the second, prove that the anharmonic ratios of the extremities of these chords are equal.

10. Prove that the radius of curvature of a conic section is proportional to the cube of the normal.

11. Find the shortest distance from a given point $x'y'$ to the parabola $y^2 = px$.

12. Find the locus of the intersection of the perpendiculars of a triangle which circumscribes a given parabola.

MR. M. ROBERTS.

1. If $a = h(1+k)$, $b = hk(1+k)$, $c = hk$, prove that $a^2 + b^2 + c^2$ is a perfect square.

2. Form the cubic whose roots are

$$l + m + n, \quad l + \omega m + \omega^2 n, \quad l + \omega^2 m + \omega n,$$

ω being an imaginary cube root of unity.

3. Find x, y from the equations

$$\frac{\sqrt{x} - \sqrt{y}}{\sqrt[4]{xy}} = x + y, \quad x^2 + y^2 = 1.$$

4. If the equation $ax^3 + 3bx^2 + 3cx + d = 0$ has a double root α , prove that

$$\alpha = \frac{2(c^2 - bd)}{ad - bc} = \frac{ad - bc}{2(b^2 - ac)}.$$

5. Find the sum of the series

$$1 - 3x + 5x^2 - 7x^3 + \dots$$

6. Convert $\sqrt{55}$ into a series of converging fractions.

7. If $(x^3 + y^3 + z^3 - 3xyz)(x'^3 + y'^3 + z'^3 - 3x'y'z') = X^3 + Y^3 + Z^3 - 3XYZ$, find X, Y, Z in terms of x, y, z, x', y', z' .

8. Eliminate x, y, z, u between the equations

$$\begin{aligned} \alpha x - y - z - u &= 0, \\ -x + \beta y - z - u &= 0, \\ -x - y + \gamma z - u &= 0, \\ -x - y - z + \delta u &= 0. \end{aligned}$$

9. Resolve $l^3 + m^3 + n^3 - 3lmn - 2ln - 2lm - 2mn$ into its factors.

1. Prove that $\int \frac{dx}{x^m \sqrt{1-x^2}}$ depends on $\int \frac{dx}{x^{m-2} \sqrt{1-x^2}}$, and find the value of $\int \frac{dx}{x^4 \sqrt{1-x^2}}$.

2. Find the value of $\int \frac{\sin \frac{\theta}{2} \tan \frac{\theta}{2} d\theta}{\cos \theta}$.

3. If $\frac{d}{dx} \{ x^p (1-x)^q (1+ax)^{-(r+1)} \} = x^{p-1} (1-x)^{q-1} (1+ax)^{-(r+2)} \{ ax^2 + \beta x (1+ax) + \gamma (1+ax)^2 \}$,

find the values of α, β, γ .

4. If $\int \frac{(a' + b' \cos \theta) d\theta}{(a + b \cos \theta)^n} = \frac{A \sin \theta}{(a + b \cos \theta)^{n-1}} + \int \frac{(B + C \cos \theta) d\theta}{(a + b \cos \theta)^{n-1}}$, find the values of A, B, C .

5. If $u = \cos^{-1} \frac{b + a \cos \theta}{a + b \cos \theta}$, find $\frac{du}{d\theta}$.

6. Find the value of $\int \frac{\sqrt{1+x^2}-1}{x} dx$.

7. Find the value of $\sin m\theta \int e^{a\theta} \sin m\theta d\theta + \cos m\theta \int e^{a\theta} \cos m\theta d\theta$.

8. Find the value of the integral $\int \frac{dx}{(x+a)\sqrt{x-x^2}}$.

PROFESSOR JELLETT.

ASTRONOMY.

1. Find the value of the annual parallax of a given star in latitude and longitude.

- a. Which of these inequalities is best adapted for detecting the existence of annual parallax?

- b. What does the second of these values become for a star whose true place is in the pole of the ecliptic?

2. Assuming the Earth's orbit to be a focal ellipse, show that the motion arising from aberration could not be produced by a central force directed to the true place of the star.

- a. If the aberratic curve be a circle, the orbit is a focal ellipse?

3. Find equations adapted to logarithmic calculation for determining the latitude of a place by means of two altitudes of the Sun and the time between, assuming the declination to remain the same.

4. Show how to determine by observation the Sun's motion in right ascension, and hence find by Flamsteed's method the right ascension itself.

- a. Explain fully why the observations are made near the equinox.

- b. Why, in general, are results deduced from observations made at times very near each other not accurate, unless the motion of the observed body be rapid?

5. Given the right ascension and declination of a star, determine its latitude and longitude by formulæ adapted to logarithms.

6. Determine the precession in right ascension and declination.

- a. If it were required to determine the coefficient of the precession by observations on the right ascension or declination of a star, what are the

positions of the stars which are best adapted to these observations, respectively?

b. Which of these observations will give the most accurate results, assuming the errors in the declination and right ascension to be the same?

7. If the Moon's motion in her orbit were uniform, show that there would still be a libration in longitude, vanishing at syzygies and quadratures, and attaining a maximum at a point nearly halfway between them.

N. B. The motion of the Moon's equator is supposed to be neglected.

a. Assuming this libration to be measured by the extent of the lunar equator, which is not always visible, show that it is nearly equal to $\frac{1}{4}\omega^2$, where ω is the obliquity of the lunar equator.

MECHANICS.

1. If a cord, passing over a pulley P , sustain at its extremities p, p' weights W, W' resting on smooth curves; and if $pn, p'n'$ be normals to these curves terminated by the vertical through the pulley, prove that

$$W \frac{Pp}{Pn} = W' \frac{Pp'}{Pn'}.$$

a. What does this equation become, if one weight hang freely?

2. A uniform beam rests with one end against a smooth vertical plane, its other end being supported by a string attached to a fixed point in the plane; determine the position of the beam, its pressure against the plane, and the tension of the string.

a. Abstracting from the thickness of the beam, one position of equilibrium will always be the vertical position. This position, except in a particular case, is not contained in the general solution given by Walton; explain this.

3. An inextensible string binds together two smooth cylinders so as to produce a given pressure; determine the ratio of the radii so that this effect may be produced by the weakest possible string.

4. A cubical block is laid on a rough horizontal plane; a string attached to the middle point of one of the upper edges of the cube passes over a pulley and sustains a weight which is gradually increased till equilibrium is broken; determine the nature of the initial motion.

5. A rigid rod rests on a rough horizontal plane, and against a rough wall; determine the greatest weight which can be attached to it at a given point so that equilibrium may be preserved.

a. If the rod be inclined to the vertical at an angle less than the angle of friction, the equilibrium cannot be broken?

6. Two material particles are connected by a string passing through a smooth ring in a horizontal table; if one of the particles receive an impulse, determine the tension on the string.

7. A material particle is projected along the convex side of a smooth vertical circle—

a. Determine whether it be always possible to give it such a velocity as to enable it to reach the top without quitting the circle.

b. If not, find at what point it will quit the circle, and where it will strike it again.

8. A particle is attached to a fine thread which just winds round the circumference of a circle, in the centre of which there is a repulsive force varying as the distance; find the tension on the thread, and the total time of unwinding.

EXPERIMENTAL PHYSICS.

MR. GALBRAITH.

1. Into a glass vessel, weighing 12 grams, and containing 15 centiliters of water at 10°C. , a piece of iron of the temperature 98° and weighing 20 grams is dropped; if the temperature becomes $11^{\circ}.3$, calculate the specific heat of the iron.

2. How is the weight of ice melted in the calorimeter connected with the specific heat of the hot body?

3. What is the law of cosines? How is it proved experimentally?

4. If a pound of water at 212°F. is converted into steam, how much per cent. of the whole heat is employed in overcoming external pressure?

5. Describe the method by which Pouillet investigated the laws of resistance in interpolars, and finally established on experimental grounds Ohm's formula.

6. State the experimental investigation of the direction and magnitude of the force which a current exercises on a magnetic pole.

7. Investigate the direction and magnitude of the force with which the two poles of a magnet act on an electric current which is perpendicular to the magnet, but does not intersect it. Prove that the force is proportional to the length of the magnet, and inversely proportional to the sine of the angle it subtends at the wire.

8. If a battery of six cells be used with interpolars of 10 meters and 40 meters, and if the deflections in a tangent-galvanometer be $58^{\circ} 30'$ and 39° , respectively; and if with one cell and the same interpolars the deflections be 30° and 11° , respectively, calculate the length of the wire of the galvanometer.

9. Give Huygens' construction for the direction of the refracted ray^s in Iceland Spar; and show that it follows directly from the principles of the Wave Theory.

10. Give an account of Newton's experiments on thin plates; state the laws he succeeded in establishing; and show how these laws are accounted for by the Wave Theory.

LOGIC AND METAPHYSICS.

DR. LUBY.

1. Cousin tests a theory of Locke's by the primary and secondary qualities of bodies; explain this, and state your own views as to the justice of this criticism.

2. The three conditions of Locke's theory of knowledge are stated and discussed by Cousin; give a brief account of these.

3. What exceptions does Cousin take to Locke's account of Enthusiasm?
4. Mention what Cousin considers as the good and the bad sides of Locke's method.
5. What does he characterize as the most general vice which governs the Philosophy of Locke?
6. Mention briefly the essential characteristic of the Sensual School, and how its vicious results have been differently stated by different writers.
7. How does Cousin explain, and whence does he derive, the principle of "Causality"?
8. To say the world is somewhere, means no more than that it does exist, according to Locke; state Cousin's criticism on this remark, and your opinion of it.
9. It has been argued that every syllogism involves a "petitio principii"; give an answer to this objection.
10. Given three distinct propositions, which, if put together properly, would make a legitimate syllogism; show that they may always be so put together.
11. If A be a logical consequence of B and C, show that B cannot be a logical consequence of A and C.

Classics.

Examiners.

THOMAS LUBY, D. D.
 CHARLES GRAVES, D. D.
 JOHN A. MALET, D. D.
 THOMAS STACK, M. A., Regius Professor of Greek.
 JOHN K. INGRAM, LL. D., Professor of English Literature.

GREEK POETS.

DR. INGRAM.

Translate the following passages into English :—

1. *Beginning*, Κύκλωπος γὰρ ἔκειτο μέγα ῥόπαλον παρὰ σπηῶ, κ. τ. λ.
Ending, ἀκρον, ἄφαρ δὲ λαβὼν ἐπυράκτεον ἐν πυρὶ κηλέψ.
 HOMER, *Odyssey*, ix. 319-328.
2. *Beginning*, χλαῖναν πορφυρέην οὐλην ἔχε δῖος Ὀδυσσεύς, κ. τ. λ.
Ending, τῶς μὲν ἦν μαλακός· λαμπρός δ' ἦν ἡἷλιος ὤς.
 Ibid., xix. 225-234.

3. *Beginning*, καθρων τοιαῦτα. νῦν δ', ὅτ' ἦν ἐργαστίον, κ. τ. λ.
Ending, χυθέντος εἰς γῆν Βακχίας ἀπ' ἀμπέλου.
 SOPHOCLES, *Trachiniæ*, 690-706.
4. a. *Beginning*, οὐδενὶ μοιριδία τίσις ἐρχεται, κ. τ. λ.
Ending, μᾶ πόλει προσάψης.
 b. *Beginning*, νέα τάδε νεόθεν ἤλθέ μοι, κ. τ. λ.
Ending, ἐκτυπεν αἰθήρ, ὦ Ζεῦ.
 Ibid., *Œdipus in Colon*, 1447-1456.
5. *Beginning*, ἐπεὶ δ' ἀφείθη πυρσὸς ὡς Τυρσηνικῆς, κ. τ. λ.
Ending, καθῆκεν ἔγχος, σφονδύλοισ τ' ἐνήρμοσεν.
 EURIPIDES, *Phœniissæ*, 1377-1389, 1407-1413.
6. *Beginning*, Φρυγίοις ἔτυχον Φρυγίοισι νόμοις, κ. τ. λ.
Ending, ἄλλον ἄλλοσε διαρμόσας ἀποπρὸ δεσποίνας.
 Ibid., *Orestes*, 1426-1450.

MR. STACK.

Translate the following passages accurately into English—

1. *Beginning*, 'Ανθ' ὧν ἄξιοί τε ὄντες, ἅμα ἀρχομεν, κ. τ. λ.
Ending, ὀτιμάλιστα αὐτονομούμενοι.
 THUCYDIDES, lib. vi. 83, 84.
2. *Beginning*, Τοῦτο τοίνυν νοητὸν μὲν τὸ εἶδος ἔλεγον, κ. τ. λ.
Ending, Μανθάνω, ἔφη, καὶ ξυγχωρῶ καὶ τάττω ὡς λέγεις.
 PLATO, *De Republica*, lib. vi. 21.
3. *Beginning*, τί ποτε διανοηθέντες οἱ ἀντιδικοὶ τοῦ μὲν, κ. τ. λ.
Ending, ἀκυρον τὴν ζημίαν ἐκρίναν.
 LYSIAS, ὑπ. τ. στρατ.
4. *Beginning*, 'Επεὶ δ', ὥσπερ τῶν ἄλλων τῶν κατὰ, κ. τ. λ.
Ending, καὶ κριτὰς τῶν ἀναγκαίων καὶ συμφερόντων.
 ARISTOTLE, *Politicoi*, lib. vii. 7.

DR. GRAVES.

Translate the following passages into English :—

1. *Beginning*, Ca. Male morigerus male facis mihi, quom sermone huic obsonas.
Ending, Cras Phœnicium phœnicio corio invisēs pergulam.
 PLAUTUS, *Pseudolus*, act i. sc. ii. 79-97.
2. *Beginning*, De. Optumam quidem mulierem. Sy. Et quidem tuo nepoti, hujus filio.
Ending, Habeat ; in istac finem faciat. Æs. Istuc recte. Ω. Plaudite.
 TERENCE, *Adelphi*, act v. sc. ix. 17-40.
3. *Beginning*, Hæc circum casis virides et olentia late.
Ending, Saxa sonant, vocisque offensa resultat imago.
 VIRGIL, *Georg.*, lib. iv. 30-50.

4. *Beginning*, Quatuor aut plures aulæa premuntur in horas,
Ending, Ut magnus, et modo me Thebis, modo ponit Athenis.
 HORACE, *Epist.* lib. ii. *Epist.* i. 189-213.
5. *Beginning*, Nulla igitur mora per Novium, mora nulla per Histrum . . .
Ending, Exæquet; nec amet quemquam nec ametur ab ullo!
 JUVENAL, *Sat.* xii. 111-130.
6. *Beginning*, Hic, hic, quem quærimus, hic est :
Ending, Et centum Græcos curto centusse licetur.
 PERSIUS, *Sat.* v. 174-191.

DR. LUBY.

Translate the following passages into English :—

1. *Beginning*, Ut tamen aliquam imaginem valli objicerent,
Ending, omnesque intus cum ipso imperatore occisos.
 LIVY, lib. xxv. c. 36.
2. *Beginning*, Sed tantum præstitit eques Romanus
Ending, dein, valida impressione puls, terga vertunt.
Ibid., lib. xxv. c. 37.
3. *Beginning*, Unum enim mihi restabat illud,
Ending, unus pro omnibus susciperem ac subirem?
 CICERO, *Oratio pro P. Sestio*, c. 20.
4. *Beginning*, Hæc sic dicuntur a Stoicis concludunturque contortius . . .
Ending, medendi facultatem reperiemus.
Ibid., *Tusc. Disp.*, lib. iii. c. 10.
5. *Beginning*, In pedite robur : quædam nationes et curru præliantur : . . .
Ending, quam nobis avaritiam.
 TACITUS, *Agricola*, 12.

DR. INGRAM.

Translate the following passage into Greek Trimeter Iambics :—

Pyl. The day of his return, as from the bath
 Arose the monarch, tranquil and refresh'd,
 His robe demanding from his consort's hand,
 A tangled garment, complicate with folds,
 She o'er his shoulders flung and noble head;
 And when, as from a net, he vainly strove
 To extricate himself, the traitor, base
 Ægisthus, smote him, and, envelop'd thus,
 Great Agamemnon sought the shades below.

Iph. And what reward receiv'd the base accomplice?

Pyl. A queen and kingdom he possess'd already.

Iph. Base passion prompted, then, the deed of shame?

Pyl. And feelings, cherish'd long, of deep revenge.

Iph. How had the monarch injured Clytemnestra?

Pyl. By such a dreadful deed, that if on earth
Aught could exculpate murder, it were this.
To Aulis he allur'd her, when the fleet
With unpropitious winds the goddess stay'd ;
And there, a victim at Diana's shrine,
The monarch, for the welfare of the Greeks,
Her eldest daughter doom'd. And this, 'tis said,
Planted such deep abhorrence in her heart,
That to Ægisthus she resign'd herself,
And round her husband flung the web of death.

From GOETHE.

MR. STACK.

Translate the following passage into Greek Prose :—

The annual labour of every nation is the fund which originally supplies it with all the necessities and conveniencies of life which it annually consumes, and which consist always either in the immediate produce of that labour, or in what is purchased with that produce from other nations.

According, therefore, as this produce, or what is purchased with it, bears a greater or smaller proportion to the number of those who are to consume it, the nation will be better or worse supplied with all the necessities and conveniencies for which it has occasion.

But this proportion must in every nation be regulated by two different circumstances : first, by the skill, dexterity, and judgment with which its labour is generally applied ; and, secondly, by the proportion between the number of those who are employed in useful labour, and that of those who are not so employed. Whatever be the soil, climate, or extent of territory of any particular nation, the abundance or scantiness of its annual supply must, in that particular situation, depend upon those two circumstances.

Among the savage nations of hunters and fishers, every individual who is able to work is more or less employed in useful labour, and endeavours to provide, as well as he can, the necessities and conveniencies of life for himself, or such of his family or tribe as are either too old, or too young, or too infirm, to go hunting and fishing. Among civilized and thriving nations, on the contrary, though a great number of people do not labour at all, many of whom consume the produce of ten times, frequently of a hundred times, more labour than the greater part of those who work ; yet the produce of the whole labour of the society is so great, that all are often abundantly supplied, and a workman, even of the lowest and poorest order, if he is frugal and industrious, may enjoy a greater share of the necessities and conveniencies of life than it is possible for any savage to acquire.—A. SMITH.

DR. LUBY.

Translate the following passage into Latin Prose :—

On the whole the steady progress of toleration is unmistakeable. The mature mind of our race is beginning to modify and soften the hardness

and severity of the principles which its early manhood had elevated into immutable statements of truth. Men are beginning to take a wider view than they did. Physical science, researches into history, a more thorough knowledge of the world they inhabit, have enlarged our philosophy beyond the limits which bounded that of the Church of the Fathers. And all these have an influence, whether we will or no, on our determinations of religious truth. There are found to be more things in heaven and earth than were dreamt of in the patristic theology. God's creation is a new book to be read by the side of His revelation, and to be interpreted as coming from Him. We can acknowledge the great value of the forms in which the first ages of the Church defined the truth, and yet refuse to be bound by them.

In learning this new lesson, Christendom needed a firm spot on which she might stand, and has found it in the Bible. Had the Bible been drawn up in precise statements of faith, or detailed precepts of conduct, we should have had no alternative but either permanent subjection to an outer law, or loss of the highest instrument of self-education. But the Bible, from its very form, is exactly adapted to our present want. It is a history; even the doctrinal parts of it are cast in a historical form, and are best studied by considering them as records of the time at which they were written, and as conveying to us the highest and greatest religious life of that time. Hence we use the Bible—some consciously, some unconsciously—not to override, but to evoke the voice of conscience. When conscience and the Bible appear to differ, the pious Christian immediately concludes that he has not really understood the Bible. Hence, too, while the interpretation of the Bible varies slightly from age to age, it varies always in one direction. The schoolmen found purgatory in it. Later students found enough to condemn Galileo. Not long ago it would have been held to condemn geology, and there are still many who so interpret it. The current is all one way—it evidently points to the identification of the Bible with the voice of conscience. The Bible, in fact, is hindered by its form from exercising a despotism over the human spirit; if it could do that, it would become an outer law at once; but its form is so admirably adapted to our need, that it wins from us all the reverence of a supreme authority, and yet imposes on us no yoke of subjection. This it does by virtue of the principle of private judgment, which puts conscience between us and the Bible, making conscience the supreme interpreter, whom it may be a duty to enlighten, but whom it can never be a duty to disobey.—TEMPLE.

DR. GRAVES.

Translate the following passage into Latin Alcaics:—

PSALM cvii. 22–31.

Translate the following passage into Latin Elegiacs:—

Ask me no more, where Jove bestows,
When June is past, the fading rose;
For in your beauties' orient deep,
These flow'rs, as in their causes, sleep.

Ask me no more, whither do stray
The golden atoms of the day;
For, in pure love, Heaven did prepare
Those powders to enrich your hair.

Ask me no more, whither doth haste
The nightingale, when May is past;
For in your sweet dividing throat
She winters, and keeps warm her note.

Ask me no more, where those stars light,
That downwards fall in dead of night;
For, in your eyes they sit, and there
Fixed become, as in their sphere.

Ask me no more, if east or west,
The phenix builds her spicy nest;
For unto you at last she flies,
And in your fragrant bosom dies.

CAREW.

GRECIAN AND ROMAN HISTORY.

DR. INGRAM.

1. Characterize briefly the genius and style of each of the following writers:—Herodotus, Thucydides, Polybius, Livy, Tacitus, Plutarch.

2. What were the two principal modes of treatment by which it was sought to reconcile the primitive Grecian myths with the critical intellect of a later age? To what class of myths was each mode for the most part applied?

3. What was the course of political development through which the Grecian communities in general passed?

4. What Athenian institutions prevented some of the most serious evils incident to an unbridled democracy?

5. To what Athenian statesmen are the following constitutional changes to be attributed:—(a) the establishment of the Senate of Four Hundred, (b) the introduction of universal suffrage, (c) the admission to office of the Thetic class, (d) the systematic organization of the popular jury-courts?

6. What were the particular political objects aimed at by Epaminondas in the Peloponnese?

7. Relate the history of Timoleon.

8. Mention some of the principal causes which paved the way for Philip's progress to supremacy.

9. Give a short account of the proceedings of Alexander in India.

10. What Greek personages does Plutarch parallel with the Gracchi? What was the political enterprise which those personages undertook?

11. Draw a map of Rome, showing the Servian Walls and the Seven Hills.

12. What was the real nature of the Servian reform?
13. Give an account of the history of Pyrrhus before his Italian expedition. How was he connected with Ptolemy Lagides and Agathocles? What were the circumstances of his death?
14. To what causes do you attribute the failure of Pyrrhus in Italy and Sicily?
15. State the difference between the Greek and Roman systems of colonization.
16. What is Mommsen's opinion concerning the political character of the Claudian family, and how does he support his view?
17. Explain the composition of the Senate during the mature period of the Republic. Who were the *senatores pedarii*?
18. What were the causes and circumstances of the exile of Cicero? When, and how, was he recalled?
19. Explain the manner in which the Roman people, under the Empire, were gradually deprived of their legislative and judicial functions. When did they lose the right of electing magistrates?
20. Between whom, and with what results, were the following battles fought:—Coronea, Crannon, Heraclea, Pydna, Tamynæ, Thapsus, Selasia?

MR. STACK.

1. Point out the several advantages which the dead languages [Greek and Latin] offer for the study of the science of language.
2. Give a brief sketch of the history of linguistic science in Modern Europe.
3. Give an account of the principal applications of Philology as an instrument of investigation.
4. Show how, in the progress of language, the same causes which create syntax tend to corrupt the original forms of speech.
5. Give a sketch of the successive changes of the Greek language in the above point of view, and point out what was peculiar in the result as regarded the Greek.
6. Give an account of the controversy as to the original development and the succession of changes in the etymological forms of language generally, and state the different views held as to the place of the Turanian family of languages in this development.
7. Give an account of the effects produced on the etymological structure of language by such causes as conquest and emigration, stating examples.
8. Write a statement with details, as to the process by which one word is derived from another in the Greek language.
9. State the forms which derived nouns assume in Greek, according as they express the *agent*,—the *action*,—the *result*,—*place*,—*abstract qualities*.
10. What is the mode of derivation of *qualitative* adjectives?

11. In derived verbs in Greek, state the forms of termination which are appropriated to special meanings, with examples.
12. State the different kinds of *composition* of words in Greek.
13. How are verbs which are *synthetic* compounds formed in Greek?
14. What are the grammatical indications of the unity of the compound verb?
15. State in detail the chief rules connected with the *augment* and *reduplication* in Greek verbs.
16. What are the cases of the *omission* of augment?
17. Give examples of *double* augments.
18. And of cases in which the augment takes the place of the reduplication.
19. Traces of a twofold Greek influence are visible in the alphabets of the old Italic languages?
20. How are we to account for the evanescence of the Old Etruscan language?
21. The existence of *double* forms of derivatives in the French language throws light on the question as to the colloquial forms of the Old Roman speech?
22. State Grimm's Law.
23. Mr. Sellar remarks on the special characteristics of the age in which Roman Satire arose, and which exercised on its character a powerful influence?
24. Mr. Sellar remarks on the fact that the early poets of Rome were of *provincial* origin; and on the effects of that circumstance on their literary career?
25. The peculiar turn of the early Epic poetry of Rome marks (as contrasted with the Greek Epic) the bias of the Roman mind at this period?
26. Mr. Sellar points out the effect produced by *oratorical* feeling on the Roman literature?
27. What were the circumstances which served to prepare the Romans for the reception of the Drama as introduced by L. Andronicus?
28. It was impossible for the Roman Drama to reproduce the inner spirit of Greek Tragedy. Comment on and explain this statement.

LOGIC.

DR. MALET.

1. How do Whately and Murray differ in their account of Opposition?
2. It is said that in Contradictories there are five points of disagreement; what are they? and show that in strictness they amount only to three.
3. Why is AEO useless? Show likewise that Bramantip may be called useless.

4. State and prove the two laws of Sorites.
5. What errors of Locke concerning Logic does Whately notice?
6. What are Whately's remarks on the names and meanings of Infirmities, and how their occurrence in a logical proposition is restricted?
7. What mistake has arisen from merely probable conclusions being deduced in a Syllogism; and how does Whately explain it?
8. What are the cases in which an argument might naturally fall into other figures besides the first?
9. What are Whately's subdivisions of the kinds of "Definition;" and with which kind does he state that Logic is concerned? Is he right?
10. In arguing in a circle, what is the best way to veil the fallacy? How does Whately illustrate this?

BISHOP LAW'S MATHEMATICAL PREMIUM.

ALGEBRA, AND THE DIFFERENTIAL AND INTEGRAL CALCULUS.

PROFESSOR JELLETT.

1. Integrate the equation

$$\frac{d^2u}{d\theta^2} + n^2u = f\theta,$$

and apply the result to the particular case where

$$f\theta = A \cos m\theta.$$

- a. What will the integral be if

$$f\theta = A \cos n\theta?$$

2. Show that the partial differential equation

$$Ar + Bs + Ct = f(x, y)$$

may be reduced to the form

$$s = \psi(x, y),$$

 A, B, C being constants.

3. Show how to integrate the system of
- m
- linear partial differential equations of the first order,

$$A_1 \frac{du}{dx_1} + A_2 \frac{du}{dx_2} + \&c. + A_n \frac{du}{dx_n} = f_1(x_1, x_2, \&c.),$$

$$B_1 \frac{du}{dx_1} + \&c. \quad . \quad . \quad . \quad . = f_2(x_1, x_2, \&c.),$$

and apply the result to the case where

$$m = 2, \quad n = 3,$$

and $A_1, A_2, \&c., B_1, \&c.$, are constants.

4. Find the value of the definite integral

$$\int_0^\infty \frac{\cos ax \, dx}{1 + x^2}.$$

5. What is the value of the integral

$$\int_0^\pi \frac{dx}{a + b \cos x},$$

where $b > a$?

6. Apply the formula for the quadrature of a surface

$$S = \frac{1}{2} \iint P \left(\frac{1}{R} + \frac{1}{R'} \right) dS$$

 n

to the determination of the entire surface of an ellipsoid, and show that it may be reduced to the two integrals

$$\int_0^\pi \frac{\sin \theta \, d\theta}{\sqrt{(a^2 \sin^2 \theta + c^2 \cos^2 \theta) (b^2 \sin^2 \theta + c^2 \cos^2 \theta)}}$$

and

$$\int_0^\pi \frac{\sin^3 \theta \, d\theta}{\sqrt{(a^2 \sin^2 \theta + c^2 \cos^2 \theta) (b^2 \sin^2 \theta + c^2 \cos^2 \theta)}}.$$

7. Show that the equation of the plane curve which makes

$$\int \phi(\rho) \, ds$$

a maximum or minimum (ρ being the radius of curvature) will be

$$\rho^2 \phi'(\rho) = ax + by + c.$$

a. If the curve be drawn between two given points, the extreme tangents not being given, show that $\rho^2 \phi'(\rho)$ must vanish at each extremity.

8. Let it be required to draw between two points a curve which would make

$$\int \phi(x, y) \, ds$$

a maximum or minimum. Then, if it be possible to draw more than one curve satisfying the condition

$$\delta \int \phi(x, y) \, ds = 0,$$

and if these curves be arranged according to the angles which their initial tangents make with a given line, no two consecutive curves will in general give real maxima or minima?

TRIGONOMETRY AND LOGARITHMS.

MR. TOWNSEND.

1. Express, by a logarithmic formula, the volume of a tetrahedron in terms of the lengths a, b, c of any three conterminous edges, and of the opposite angles α, β, γ they make with each other in pairs.

2. Express again the volume of the same in terms of the lengths a and a', b and b', c and c' of its three pairs of opposite edges.

3. Express, as a determinant, the relation connecting the cosines of the six arcs α and α', β and β', γ and γ' which connect in opposite pairs any four points P, Q, R, S on the surface of a sphere.

4. Investigate the equation of the n^{th} degree whose roots are the cosines of the n arcs $\alpha, \beta, \gamma, \delta, \epsilon$, &c., connecting any point P on a sphere with the n vertices A, B, C, D, E , &c., of any regular polygon on it.

5. Prove Legendre's Theorem, that if the sides a, b, c of a very small spherical triangle be straightened into lines, the angles A, B, C will be diminished each by a third of the spherical excess.

6. If x be an angle differing very little from $\frac{\pi}{2}$, and δx any small increase or diminution of it, investigate the corresponding changes in the functions $\log \sin x, \log \tan x, \log \sec x$.

7. If the function $(a^2 - 2ab \cos x + b^2)^{-\frac{1}{2}}$ be expanded in an infinite series of the form $\frac{1}{2}A_0 + A_1 \cos x + A_2 \cos 2x + \&c.$, required the relation connecting every three consecutive coefficients A_{k-1} , A_k , A_{k+1} .

8. In general, if any function F of x , which is such that $F(x) = F(-x)$, be expanded in an infinite series of the same form, express, as definite integrals, the values of the several coefficients A_0 , A_1 , A_2 , &c.

9. Determine the value of the definite integral $\int_0^\pi e^{-x^2} dx$ between the limits infinity and nothing.

10. Given that

$$\frac{dx}{\sqrt{a^2 + 2ab \cos \alpha x^2 + b^2 x^4}} = k \cdot \frac{d\theta}{\sqrt{1 - c^2 \sin^2 \theta}},$$

required the values of c , k , and θ in terms of a , b , and x .

HEBREW EXAMINATION, AND THE PRIMATE'S PRIZES.

SENIOR CLASS.

DR. TODD.

1. It is objected against the authenticity of the later prophecies of Isaiah, that in the passage (lxiv. 10), "Thy holy cities are a wilderness, Zion is a wilderness, Jerusalem a desolation, Our holy and beautiful house, where our fathers praised thee, burned up with fire," &c., the author speaks as a contemporary of the Babylonian exile; how is this answered?

2. The later prophecies, beginning at ch. xl, divide themselves into three parts; parts I. and II. conclude with the same words; and part III. with an expansion or paraphrase of the announcement made in those words?

3. Give an account of the distinguishing differences, as regards the subject matter, in these three parts or sections of the later prophecies.

4. Point, and translate:—

כח אשר האל יורה בורא השמים ונושמים

רקע הארץ והצביון

נתן נשמה לעם עליה ויורה לאלהים בה :

(a). To what *מִצְוָה* of the Law does the *הַמִּצְוָה* in which these words occur correspond?

(b). The word *נושמים* appears to be grammatically anomalous; how is this explained?

(c). It has been proposed to read נמנעום; how would this affect the translation, and what gain would it be?

(d). The unusual phrase נמני השמים may be supported by another passage in Isaiah?

5. The words יהוה מדי דוד are repeated at the end of the Book of Isaiah; explain the reason of this.

6. In what other Books of the O. T. is the same thing done? Give the Masoretic mnemonical word for the names of these Books.

7. Translate the Masoretic note at the end of the Book of Isaiah.

SENIOR AND MIDDLE CLASS.

DR. TODD.

1. Translate and explain the Masoretic note which occurs at the end of the Psalms.

2. Give some account of the Masorah; (a) meaning of the name; (b) by whom first printed; (c) the manner in which it is printed, and its division into *parva*, *magna*, and *finalis*.

3. Translate the following; and explain the Masoretic notes:—

הושיע יהוה כִּיגְמֹר הַסֵּף
 כִּיפָסֹו אֲמוֹנִים מִבְּנֵי אֲדָם : ל
 שׁוּא יִדְבְּרוּ אִישׁ אֶדְרֵעֻזּוֹ
 שֶׁשֶׁת הָאֲקָת בִּלְבָב וְלֵב יִדְבְּרוּ : ג' ד'
 יֵרֵחַ יִהְיֶה מִלִּשְׁשָׁתִי הָאֲקָת נ' קי' ג'
 לְשׁוֹן מִדְּבַר גְּדֻלָּתוֹ : י'

The *Masora magna* on the word הָאֲקָת is as follows:—

הָאֲקָת ג' וְסִמֵּן רַבּוֹ הָאֲקָת שֶׁשֶׁת הָאֲקָת בִּלְבָב וְלֵב דְּבַר יֵרֵחַ י' מִלִּשְׁשָׁתִי הָאֲקָת :

4. Point and translate:—

יהוה מִיִּנְחָו בְּאֶחָד
 מִיִּשְׁכָן בְּדֶר קֶשֶׁךְ :

(a). What is the difference between נֶר and שֶׁכֶן? Show this by examples.

(b). The allusion in בְּדֶר קֶשֶׁךְ is not inconsistent with the Psalm having been written by David? Show this by other examples.

5. Translate into English :—

למנצח לעבר יהוה לוד : סמסשע לרשע בקרב לבי איךסודו אלהים לנו עיני :
 כיהחליק אלו בעיני למצא עונו לשנא : רברישו און ומרמה ודל להשכל לחשיב :
 און חושב על משכבו יחיצב על דרך לארמוב רע לא ימאם : יהוה בהשמים חסוך
 אמונתך ערשחקים : צדקתך כחוראל מששמיד חתום רבה אדם ובהמה חושע
 יהוה : מדיקר חסוך אלהים ובני אדם בצל כנשך יחסין : ירין מדשן ביתך ודל
 עניך חשקם : כי עמך מקור חיים באורך נראהאר : משך חסוך ליעדך וצדקתך
 לישירלב : אלתבואני רגל נאוו ויד רשעים אלתנני : שם נעלו מעלי און דחו
 לאריכלו קום :

6. State the principal arguments for and against the opinion that the present square characters are the ancient form of the Hebrew alphabet; noticing—

(a). The testimony of St. Jerome.

(b). The names given by the Jews to the present Hebrew and Samaritan characters, respectively.

(c). The argument from coins.

7. The derivation of the Hebrew, בן, *a son*, from בנה, *is untenable*; show this from its connexion with the Chaldee, Latin, and Greek words for *son*.

MR. LONGFIELD.

Translate the following passage :—

הון מתקל ימעת וקבץ עליד ירדה : תוללת חמשקה כחולה לג ועץ חיים
 תאונה נאה : בן לרבר יתקל לו ורמא כחצה נחמא ישלם : תולת חכם מסוד
 חיים לסוד כחלש כחיה : קול טוב יתרוח וחרך בגדים איתן : פלשחם יעשה
 ברעת וקסיל יתלש אגלת : מלחקו רשע יפל ברע חריר אמונים כחמא : ריש
 וקלון פורע מסוד לשמך תוכחת יכרד : תאונה גזיה קעגרב לנשש וקועבת
 פסלים סוד כרע : הולקו את חכמים יחנכם וקעה פסילים ירוע : חפשיים תרנח
 רעה ואת צדיקים ישלם טוב : טוב יתל בגרבים וצפון לצדיק חיל חוסמא :
 רבאקל גיד ראשנים ויש לקפה גלא מששם : חושך לשבמו שונא בנו ואחבנו
 שדורי מסוד : צדיק אכל לשבע חסלו ונמן רשעים תחור :

Prov. xiii. 11-25.

Translate the following passage into Hebrew :—

PSALM civ. 24-35.

PSALMS I.—XLI.

A.—1. Give the substance of some of the notices by the Fathers of the division of the Psalms into Books. How may this division be accounted for?

2. Whence has it been concluded that this division is as old as the time of Nehemiah?

3. Give some of the arguments which have been urged for and against the authenticity of the superscriptions of the Psalms.

4. How do those who maintain their authentic character account for the ascription to David or Asaph of Psalms manifestly of a later age?

5. What are the Hebrew terms in the superscriptions which are rendered by the LXX. translators, *σθηλογραφία*, *ὑπὲρ τῆς κληρονομώσεως*, *ὑπὲρ τῆς ἀντιληψίως τῆς ἐωθινῆς*, *εἰς σύνεσιν*, *ὑπὲρ τῶν κρυφίων τοῦ υἱοῦ*, and how do you explain the terms in the original?

6. The number of one of the Psalms is indicated where it is cited in the New Testament? There are grounds for supposing that the *textus receptus* of the New Testament in this passage is incorrect?

7. What are the Books of the Old Testament which collectively are designated by the mnemonic מנא, and what is their peculiarity?

B.—1. Ps. ii. 9.

: הַיְּמִינִי יִשְׁבֹּן בְּרֶגֶל בְּכֹל יְמֵי הַחַיִּים

a. In order that *רוּחַ* might be rendered, according to the LXX. interpretation, *ποιμανεῖς αὐτοὺς*, is it necessary that the vowels should be different from those in the Masoretic text?

b. State what you consider to be the chief objection to the LXX. interpretation.

c. Show that *רוּחַ* in the sense of *ruling* is not always used in a good sense.

d. Some commentators think that in the last clause of the verse there is an ellipsis of a preposition? Point out the objection to their mode of explaining the clause.

2. Ps. vii. 5.

: אִם יִמְלֹךְ שָׁלֵחַ רַע וְאֶחָדָה צָדִיק רִקָּם

a. The former clause of this verse is thus rendered by the LXX. : *εἰ ἀνταπίδωκα τοῖς ἀνταποδιδούσί μοι κακὰ*. Point out the objection to this rendering.

b. Write a note on the verb *שָׁלַח*, and mention the various interpretations which have been proposed of the latter clause of the verse. To what event in the history of David is there probably here a specific reference?

c. Give the LXX. version of the latter clause, and show how it was derived from the Hebrew.

3. Ps. x. 10.

עָנִי וְתַלְפֵּה יִצְעָנִי :

a. Notice the different views that have been taken of the words תַּלְפֵּה and יִצְעָנִי.

b. Translate the commentary of Jarchi on the passage :

עָנִי שֶׁל עַשׂו לְיִשְׂרָאֵל שֶׁהֵם חֵלְךָ יִצְעָנִי.

a. It is said in the Masora Magna on Gen. xxx. 11, that the word תַּלְפֵּה (v. 10), apparently the plural of תַּלְפָּה, is

אֶחָד מִזֵּמַּשׁ עֲשָׂה חֲבוּת הַחֲבוּתִים חֲבוּת אֶחָד וְנִקְרָא שֶׁהִי חֲבוּת.

What is the meaning of this?

4. Ps. xii. 9.

כִּיבִי וְשָׁעִים תִּתְקַלְכֵּן פֶּרֶם לְבִי אָרָם :

a. Write a note on the word לְבִי. How does Gesenius interpret the passage?

b. The LXX. render the latter clause, κατὰ τὸ ὕψος σου ἐπολυώρησας τοὺς υἱοὺς τῶν ἀνθρώπων. How do they seem to have read the original?

5. Ps. xvii. 3.

וַיִּפְתֵּי בִלְיַעֲרָפִי :

Write a note on the word וַיִּפְתֵּי. From the fact that the Masorets noticed that it is בלע, what is to be inferred as to their opinion as to the meaning of the word? State your view as to the interpretation of the passage.

6. Ps. xix. 4.

אִמְרָתְךָ וְחַן דְּבָרִים בְּלִי נִשְׁפָּע קוֹלָם :

a. Point out an objection to the LXX. interpretation of this passage : οὐκ εἰσι λαλιαὶ οὐδὲ λόγους, ὧν οὐχὶ ἀκούονται αἱ φωναὶ αὐτῶν, and show how it may be otherwise explained.

b. Write a note on the word בְּלִי. This word enters into a compound which is found in the Psalms? How is this latter word expressed by the LXX. in the various places in which it occurs?

7. Ps. xxvii. 13.

לֵאמֹר הִתְנַחֲתִי לְרֹאשׁ בְּשׁוּב יְהוָה בְּאָרֶץ חַיִּים :

a. Translate the commentary of Aben-Ezra on this passage :

זֶה קֶשֶׁר בְּאֶשֶׁר לִפְנֵי כַמֶּנֶס וַיִּשְׁלֹו בִי שִׁמְאֵל לֵאמֹר בְּשֵׁם הָאֱמֻנָה לִנְשֹׂא קוֹל אֵל יי

b. Explain the Masoretic note on לֵאמֹר :

נִקְדָּה מִלִּמְנָח וּמִלְמַלְחָה חוּץ מִן רֹאשׁ שֶׁלָּה נִקְדָּה אֵלָּה מִלְמַנָּה.

and account for the peculiarity thus indicated.

c. Illustrate the meaning of אֶרֶץ חַיִּים by referring to other passages in which the expression occurs.

8. Ps. xxxvii. 20.

כִּי וְשָׁעִים יִבְרָא יְהוָה כִּי־שֶׁר פֶּרֶם בְּלִי בַעֲשָׂן :

בְּלִי :

a. The words כִּי־שֶׁר are susceptible of different interpretations?

What is the root of the word כָּחַ? Trace the same root in the Aryan languages.

b. Show how the rendering of these words by the LXX., *ἄμα τῷ δοξασθῆναι αὐτοὺς καὶ ὑψωθῆναι*, and that of Jerome, *gloriantes ut monocerotes*, were derived from the original.

9. Ps. xl. 7.

אָנֹכִי כְּפֶה לִי :

a. Explain and illustrate the meaning of these words. What is the principal objection to supposing (with Pearson and others) that there is a reference to the custom (Exod. xxi. 6) of boring the ear as a sign of servitude?

b. How are the words rendered by the LXX.? Some think that this rendering was derived from a different reading of the original?

JUNIOR CLASS.

TRANSLATION AND GRAMMAR.

MR. POOLE.

Translate the following passage into English Prose:—

וַיַּעֲבֹד הָעָם אֶת יְהוָה כֹּל יְמֵי הָאֵלֶּשׁ וְכָל יְמֵי הָאֲלֹהִים אֲשֶׁר הָאֲרָצִים יָמִים
 אֲחֵרֵי הָאֵלֶּשׁ אֲשֶׁר רָאָה אֶת כָּל מַעֲשֵׂה יְהוָה הַגָּדוֹל אֲשֶׁר עָשָׂה לְיִשְׂרָאֵל : וַיִּכְתֹּב
 הָאֵלֶּשׁ בְּרִנָּן עַבְדֵי יְהוָה בֶּן מֵאָה וְעֶשְׂרִי שָׁנִים וַיִּקְרָא אֹתוֹ בְּגִבְלוֹתָיו
 בְּזִמְנֵת הַיָּם בְּיַם אֲפָרַיִם מִצְּמֹחַ לְהַרְגֵּשׁ : וְגַם כִּלְיָדוֹ הָיָה מִכֶּסֶד אֶל־מִבְּרִית
 וַיִּקְרָא דָּוִד אֹתוֹ אֲחֵרֵיהֶם אֲשֶׁר לֹא־יָדָעוּ אֶת־יְהוָה וְגַם אֶת־הַמַּעֲשֵׂה אֲשֶׁר עָשָׂה
 לְיִשְׂרָאֵל : וַיַּעֲשֵׂה בְּנֵי־יִשְׂרָאֵל אֶת־הַרְעָה בְּעֵינֵי יְהוָה וַיַּעֲבֹד אֶת־הַבְּעֵלִים : וַיַּעֲשֶׂה
 אֶת־יְהוָה : וְאֵלֶּיךָ מִבְּרִיתָם הַפְּדִיָּה אוֹתָם מִכַּרְךָ סָבְרִים וַיִּלְכְּ אֹתָם : וְאֵלֶּיךָ מִבְּרִיתָם
 הַפְּדִיָּה אֲשֶׁר מִבְּרִיתָם וַיַּעֲשֶׂה אֶת־יְהוָה : וַיַּעֲשֶׂה אֶת־יְהוָה : וַיַּעֲשֶׂה אֶת־יְהוָה
 וַיַּעֲבֹד לְבַעַל וְלַעֲשָׂתוֹת : וַיַּעֲשֶׂה אֶת־יְהוָה בְּיִשְׂרָאֵל וַיַּעֲשֶׂה בְּיַם שִׁטִּים וַיַּעֲשֶׂה אוֹתָם
 וַיַּעֲשֶׂה בְּיַם אֲרִיִּיָּהם מִשְׁלִיב וְלֹא־יָדָעוּ עוֹד לְעַמְּךָ לְשֵׁנֵי אֲרִיִּיָּהם :

1. When is the *full*, and when the *defective* mode of writing the vowels in Hebrew usually adopted?

2. The *quantity* of the vowel in a syllable is closely connected with the presence or absence of the accent?

3. When is ν equivalent to δ in an open syllable? and what is the peculiarity of the semi-vowel ν ?

4. How is *metheg* used; and how may it be distinguished from *sillug*?

5. Write the words בָּכָה , בָּעַל , with the pronominal suffix of the first person in the singular.

6. Write the plural of the words אִימָה , אָמָה , עָבָד , פֶּסַח , מִצְוָה .

7. State the different significations of the *Niphal* and *Piel* conjugations of the Hebrew verb.

8. Write the forms of the persons in the *preterite Kal*, as used with *suffixes*, of the verb בָּרַל .

9. What are the limitations of the use of *Nun epenthetic* in the verbal *suffixes*?

10. What are the third persons plural *preterite Niphal* of the verbs עָבַד , כִּוֵּחַ ?

11. State the verbs from which the following words come, and what parts of those verbs they are. Whence arise their differences from the corresponding parts of the regular verb? הַכְלִיחַ , וַתִּלְךְ , צָחָה , וַתִּהְרָם .

12. With what parts of the verbs from which they are derived are the following nouns most closely connected? הַתְּחִינָה , אִיזָה , $\text{הַתְּחַיָּה$.

13. In what cases is the *future* in Hebrew used for the *present*, and the *past*; and when for the *imperative* mood?

14. State the principal instances in which the construct state of a noun is used besides the ordinary one when a genitive follows it.

15. Distinguish the force of the *conditional* conjunctions אִם , לֹא . How are the words *utrum* *an* expressed in Hebrew?

16. Analyse, and explain the formation of the following:—

וַיִּנְצֵנוּ , הַפְּרִיטָה , בְּהִבְחָה , לְיִמְיָהוּ .

17. Write down in their order the names of the different accents occurring in the *first verse* of the passage given above; and classify them as *conjunctive* or *disjunctive*.

MR. ABBOTT.

a. וְהָיָה אִם תִּשְׁכַּח שְׂמִינָה וְאִם לֹא תִשְׁכַּח לְשִׁמְיָהּ הַשְּׂמִינָה רַבֵּץ וְהָיָה
הַשְּׂמִינָה וְהָיָה הַמִּשְׁלָל בּוֹ

b. עָדָה וְעָדָה שְׂמִינָה קוֹלִי נָשִׁי לְכָךְ הַשְּׂמִינָה אִמְרָתִי כִי אִישׁ הַרְגָתִי
לְשִׁמְיָהּ וְיָלַד לְהַרְגָתִי כִי שְׂבָעִימָם יִשְׁכַּח לְכָךְ שְׂבָעִים וְשְׂבָעִה:

c. לֹא-יִדְוֹן וְהָיָה בְּאֵדָם לְעֵלִים בְּשָׁנָם הָיָה בְּשָׁנָם:

d. וְהַמִּשְׁלָל הַשְּׂמִינָה וְהָיָה וְהָיָה אִם שְׂבָעִה הַשְּׂמִינָה וְהָיָה וְהָיָה:

וְהַבְּאִקָּה אֶל־עֲבָדָהּ וְלֹא נִדְעַ כִּי בָּא אֶל־עֲבָדָהּ וְכִרְמִיתָהּ רַע כְּאִשָּׁר בְּהִלְחָהּ
: וְקָרָא

6. וְהַבְּאִקָּה אֶל עֲבָדָהּ הַיְּהוּדִי אֶל־וְהַבְּאִקָּה עִינֵי עַלְיוֹ : וְהַבְּאִקָּה אֶל־אֲרָמִי
לֹא־יִכַל הַנָּעַר לַעֲבֹד אֶת־אֲבִיו וְעַבֵּד אֶת־אֲבִיו וְכֹחַ :

1. Translate these passages literally.

2. Write notes on the first three.

3. Parse the words—

הַבְּאִקָּה, הַיְּהוּדִי, וְהַבְּאִקָּה, וְהַבְּאִקָּה, וְהַבְּאִקָּה, וְהַבְּאִקָּה, וְהַבְּאִקָּה.

4. Analyze the words—

וְהַבְּאִקָּה, וְהַבְּאִקָּה, וְהַבְּאִקָּה.

5. Explain the pointing of the first syllable of

וְהַבְּאִקָּה, וְהַבְּאִקָּה, וְהַבְּאִקָּה.

6. The LXX. render the first passage—*Οὐκ ἴδεν ὁρθῶς προσεγγενης, ὁρθῶς δὲ μὴ δειλῆς, ἡμαρτες; ἡσύχασον.* Explain the construction and reading which they adopted.

7.—Ch. xlix. 19, 20.

וְהַבְּאִקָּה אֶל־עֲבָדָהּ וְלֹא נִדְעַ כִּי בָּא אֶל־עֲבָדָהּ וְכִרְמִיתָהּ רַע כְּאִשָּׁר בְּהִלְחָהּ

Translate. What was the ancient interpretation of ver. 19?

8. What is the difficulty in ver. 20?

9. A slight alteration removes a difficulty in both verses?

10.—Ch. xlix. 21, 22.

וְהַבְּאִקָּה אֶל־עֲבָדָהּ וְלֹא נִדְעַ כִּי בָּא אֶל־עֲבָדָהּ וְכִרְמִיתָהּ רַע כְּאִשָּׁר בְּהִלְחָהּ
: וְהַבְּאִקָּה אֶל־עֲבָדָהּ וְלֹא נִדְעַ כִּי בָּא אֶל־עֲבָדָהּ וְכִרְמִיתָהּ רַע כְּאִשָּׁר בְּהִלְחָהּ

a. Translate. The LXX. render v. 21 : *Νεφθαλι στελέχος ἀνειμένον, ἐπιδιδούς ἐν τῷ γεννήματι κάλλος.* What reading does this rendering imply?

11. Give the two interpretations of v. 22, according to the sense assigned to וְהַבְּאִקָּה and וְהַבְּאִקָּה.

12. Account for the LXX. rendering: *υἱὸς ἡβξημένος μου ζηλωτός, υἱὸς μου νεώτατος, πρὸς μὲ ἀνάστρεψον.*

13. Point and translate the following:—

וְהַבְּאִקָּה אֶל־עֲבָדָהּ וְלֹא נִדְעַ כִּי בָּא אֶל־עֲבָדָהּ וְכִרְמִיתָהּ רַע כְּאִשָּׁר בְּהִלְחָהּ
: וְהַבְּאִקָּה אֶל־עֲבָדָהּ וְלֹא נִדְעַ כִּי בָּא אֶל־עֲבָדָהּ וְכִרְמִיתָהּ רַע כְּאִשָּׁר בְּהִלְחָהּ

14. Write notes on the words

וְהַבְּאִקָּה, וְהַבְּאִקָּה, וְהַבְּאִקָּה.

15. State the significations in Kal and in the derived Conjugations of the verbs *לָמַד* and *לָקַח* respectively.

Translate the following passage into Hebrew :—

GENESIS, xxvi. 1-7.

EXAMINATION FOR PRIZES IN POLITICAL ECONOMY.

PROFESSOR HOUSTON.

Morning.

1. How would you classify the revenue received by each of the following persons, respectively :—

- a. A *Métayer* landlord ;
- b. A peasant proprietor ;
- c. A skilled handicraftsman ;
- d. An apothecary ;
- e. A small retail dealer ;
- f. A planter in a country where slavery existed ?

2. Dr. Whewell ("Lectures on Political Economy," p. 71) states that "Rents may increase not only by the extension of cultivation to poorer soils, but also by the improvement of methods of culture;" and that "the increase of rents in England has arisen from such improvement much more than from the extension of culture to poorer soils."

Say whether you agree with the views put forward in this passage ; if so, on what grounds ;—and, if not, explain what, in your opinion, is the effect produced on rent by the extension of cultivation to poorer soils, and by the improvement of methods of culture, respectively ; how that effect is produced ; and to what, in your opinion, is the rise of rent in England attributable.

3. Archbishop Whately ("Lectures on Political Economy," p. 165) says : "They (the labouring classes) are apt to imagine, when they see a rich man whose income is a hundred times as much as suffices to maintain a poor man's family, that if he were stripped of all, a hundred poor families additional might thus obtain subsistence ; which it is plain would not be the case, even when the income was spent in such ostentatious and selfish vanity as I have been alluding to" (namely, in employing men to make lace, or dive for pearls to add to the splendour of his dress, or in waiting at his table).

State fully your opinion of the soundness of the views put forward in this passage ; giving your reasons for that opinion, and, if necessary, illustrating it by an example.

4. What plan is proposed by Mr. J. S. Mill for the permanent amelioration of the condition of the Irish people, and upon what economic bases does the efficacy of such a remedy rest?

5. Mr. Senior, speaking of a machine for making corkscrews, which enabled the manufacturer to dispense with the labour of 59 men out of 60, says: "Some of the corkscrew makers must have been thrown out of work, and the rate of wages in that trade probably fell. But as the whole fund for the maintenance of labourers and the whole number of labourers to be maintained remained unaltered, that fall must have been balanced by a rise somewhere else."

Do you consider this reasoning sound?—if not, point out where the flaw occurs.

6. *a.* What is the *immediate* effect produced upon rent, and upon the price of raw produce, by the following imposts:—

- i. A tax on each cultivated acre;
- ii. A tax upon each quarter of corn raised;
- iii. A tax on each quarter of corn imported;
- iv. A tax upon the rent actually paid?

b. What is the *ultimate* effect of a tax on agricultural produce?—and what is the *ultimate* effect of a tax on agricultural rent?

7. *a.* How does Adam Smith account for the drain of gold which follows an excessive issue of convertible paper, and how far do you consider his account correct?

b. How would Smith propose to ascertain whether or not the substitution of a paper for a metallic currency was a benefit to the country in which it took place? Do you think the tests he applies are sound?

8. What are the advantages of a mixed metallic currency? Show by illustrative examples the objections to which the maintenance of a double standard is open.

Evening.

1. What economic advantages does a co-operative manufactory possess over one belonging to a single capitalist?—and what advantages do co-operative stores established for the retailing of goods possess over co-operative manufactories?

2. What are the views entertained by Smith and Senior, respectively, with regard to the character of the revenue derived from the hire of houses, carriages, furniture, and articles of the same class? How far do you consider them sound?

3. Say whether you think it possible for the wages of the labouring classes to be permanently raised by the action of trade societies. If you think so, explain the mode in which such a result can be brought about.

4. State concisely, in a series of propositions, Smith's theory of rent; and which of these propositions you believe to be true, and which erroneous.

5. *a.* Explain exactly the function discharged by statistics in the different stages through which a science passes.

6. What circumstances render the collection and registration of facts more important in the social than in the physical sciences?

6. By what rules should a statistician be guided in the collection of facts, and in drawing inferences from them?

7. In accounting for the differences existing between the rates of remuneration in different employments, Adam Smith mentions agreeableness among the circumstances which cause an occupation to be pecuniarily underpaid. Under the term *agreeableness* he includes the enjoyment of social position. From this it has been argued that Civil Servants, so far as their pecuniary remuneration is concerned, must necessarily be underpaid, since an appointment in the Civil Service confers a certain amount of social position. If you think this a correct inference from Smith's principle, reconcile your opinion with the fact that the larger the salary of a public official, the higher, *cæteris paribus*, his social position; so that, if the emoluments of Civil Servants were universally increased, their social position would be as universally raised. If you do not think the inference correct, say whether Smith's principle is unsound, or whether any, and, if so, what circumstance prevents its applying to the present case.

8. Professor Kingsley ("Associative Principles applied to Agriculture," p. 39) says, on the authority of Liebig: "The population of any country returns to the soil, in the form of sewage, fit for immediate absorption by the roots of plants, the whole raw material of its last year's food, i. e. all the home-grown and all the imported food. . . . Suppose a population of 10,000, who are fed for one year by home-grown food for 8000, and imported food for 2000, they will return to the soil, as raw material for next year's crop, food for 10,000. By the end of the year they will have increased, say 5 per cent. Then next year there will be 10,500 people to feed on home-grown food for 10,000 + that year's imports, and which therefore need be this year only enough to feed 500; and the next year after the population, though increasing at the same rate, would more than support itself, and become an exporter of food."

Admitting the truth of the assertion contained in the first paragraph of the above extract, is the conclusion, that after the second year the population would more than support itself, sound? If you think not, point out where the error lies.

GENERAL DIVINITY EXAMINATION.*

JUNIOR CLASS.

PROFESSOR'S LECTURES.

1. The minor limit of the extent of Natural Theology may be expressed in the words of S. Paul?
2. What is meant by the *Absolute* in the reasoning of the Pantheist?
3. What is the standing formula of Pantheism?
4. The modern objection to the eternity of future punishment is based upon the partial recognition of an insoluble difficulty; show this distinctly.
5. What *three* facts can the believer in revelation appeal to in proof of the actual exercise of a *supernatural* power?
6. What system of unbelief is refuted by proving the apostolic origin of the Books of the New Testament?
7. Mr. F. Newman asserts that he cannot depress his conscience to the level of the morality of Scripture; criticize this assertion.
8. Answer the objection of modern sceptics against Messianic Prophecy.
9. Show by examples from Scripture that the predictive element in prophecy does not involve the destruction of free-will.
10. By what narrative in the New Testament is Renan's statement that miracles were believed on insufficient evidence shown to have no foundation?
11. What is the principle known as "*communicatio Idiomatum*"?
12. The consideration of the doctrine of the Atonement renders apparent the error of Patripassianism?
13. What mediæval error succeeded the settlement of the controversy as to the Person of Christ, and by what steps?
14. What is the misinterpretation by modern critics of the saying of S. Irenæus that Christ has redeemed us, not by force, but "*secundum suadela*m"?
15. What is the ultimate fact at which we must pause when speculating as to the mystery of the Atonement?
16. In what text does the word Atonement occur in the English version of the New Testament? What is the Greek equivalent, and how is it usually rendered?

* The greater part of this Examination, both in the Senior and Junior class, is conducted *visà voce*.

17. The words of Institution of the Eucharist can only be explained by reference to the ancient sacrificial system ?

18. This instance, as well as the constant use of the sacrificial language of the Old Testament in the New, supplies an answer to what modern objection ?

19. Whence the importance of considering the question as to the origin of the rite of Sacrifice ?

20. How was the sacrifice of Christ typified by the threefold Levitical Sacrifice ?

MAGEE ON THE ATONEMENT.

DR. LEE.

1. By what test does Magee try and refute the objection against the notion of a Mediator founded upon the supposition of the Divine immutability ?

2. How does he answer the objection of those who set up the doctrine of pure intercession in opposition to that of atonement ?

3. How does Dr. Clarke answer the question, "Could not God of His supreme authority, without any sufferings at all, have pardoned sin" ?

4. Magee suggests what the Christian's answer should be to the inquiry, "In what manner is the sacrifice of Christ connected with the forgiveness of sins" ?

5. Magee, to a certain extent, qualifies his assertion that when Scripture speaks of our being reconciled to God, it is meant that God is reconciled to us ?

6. Although Scripture does not expressly say that God is reconciled to us by the death of Christ, still the wrath of God against the disobedient is spoken of in almost every page ? Give some instances.

7. On three grounds it is argued, that when it is said that Christ laid down His life *for*, or *on account of* mankind, the application of these terms is but figurative ?

8. Give the substance of Magee's reply to the *third* of these objections.

9. How is the Hebrew term which signifies "to atone," translated in the LXX. and the ancient Latin ?

10. Quote some of the leading passages of Scripture which may be adduced in considering the question, "Were the Mosaic atonements applicable to cases of moral transgression" ?

SCHOOL OF ENGINEERING.

SENIOR CLASS.

MR. TOWNSEND.

PRACTICAL MECHANICS.

1. A wall of limestone, sp. gr. = 2.6, 500 ft. long, 25 ft. high, and 2 ft. thick, sustains a pressure P inclined 66° to the horizon at every foot of its upper internal edge; required, in tons, the limiting value of P consistent with equilibrium.
2. If, in the same case, the wall were supported by a sufficient number of buttresses extending 4 ft. outwards from its base; required, again in tons, the increased value of P consistent with equilibrium, the weights of the buttresses being neglected.
3. If a wall, of the same length, height, and material, sustain the pressure of a bank of earth, sp. gr. = 1.75, and natural slope = 56° , reaching to its upper edge, and thence sloping upwards at its natural inclination; required, in feet, its limiting thickness consistent with equilibrium.
4. Calculate, in tons, the entire pressure of water on each face of a rectangular reservoir, 1000 ft. long all through, 30 ft. deep at centre, and 100 and 75 ft. broad at surface and base, respectively, the base all through being supposed horizontal.
5. If the supporting chains of a suspension bridge, of 500 and 50 ft. in span and fall, respectively, receive each an extension of 1 ft. in length; calculate, in inches, the central depression thence resulting.
6. If, in the same case, the roadway be 1 cwt. weight per square foot of area, calculate, in tons, the horizontal tension on each chain, supposed to sustain 6 ft. of its breadth; the weights of the chains themselves, as well as of the supporting rods, being neglected.
7. Calculate, in inches, the central deflection of a uniform elastic bar, 16 ft. long, 4 in. deep, and $1\frac{1}{2}$ in. thick, supported at both ends, under the action of the transverse force which, applied longitudinally, would extend or compress it .0001 inches.
8. A horizontal beam, 20 ft. long, and 2 cwt. weight, supported at both ends, is loaded with weights of 1, 2, 3, and 4 cwt. at distances of 4, 8, 12, and 16 ft. from one end; calculate, in foot cwts., the entire bending moment at its middle point.
9. A uniform sphere, 1 ft. in diameter, and 112 lbs. in weight, revolves round a diameter 40 times per minute, while advancing rectilinearly 1000 ft. per second; calculate, in foot pounds, the entire amount of work accumulated in it.
10. Determine, in the same case, in inches, the distance from the line of motion of its centre, at which, moving as above, it would strike against an obstacle with the greatest force of percussion.

THEORETICAL MECHANICS.

1. A force R is resolved into two P and Q in directions making angles α and β with its own, respectively; required the values of P and Q .
2. A body of any kind, whose weight = W , is suspended from two points A and B in the same horizontal line not passing through the point of suspension C ; required the tensions on the suspending cords.
3. A rigid body, whose weight = W , is supported at two points A and B in the same vertical line not passing through its centre of gravity C ; required the pressures on the points of support.
4. Prove the general property that the sum of the moments of any number of forces in the same plane is equal to the moment of their resultant with respect to any point in the plane.
5. Prove the general property that the sum of the moments of any number of parallel forces is equal to the moment of their resultant with respect to any parallel plane.
6. State the principle of "constancy of work" in the equilibrium of machines; and apply it to determine the conditions of equilibrium in the *Screw* and in the *Hydrostatic Press*.
7. Prove the general property that the entire pressure of water on any immersed surface is the same as on a plane surface of equal area immersed horizontally to the depth of its centre of gravity in the water.
8. Define the "centre of pressure" in the case of a plane area; and determine its position in the particular case of a triangle of any form having one side horizontal and at the surface of the water.
9. In a common barometer, required the change in the height of the column of mercury consequent on a given change in the pressure of the atmosphere.
10. The two equal weights in an *Atwood's Machine* are each = 1 lb.; required what weight added to one would get up in one minute a velocity of 1 foot per second.
11. In the circular pendulum, required the changes in the time of vibration consequent on given small changes in the length of the pendulum and in the force of gravity.
12. If a body be projected vertically upwards *in vacuo*, show that its times of ascent and descent, and also its velocities of departure and return, are equal.

THEORY OF THE STEAM-ENGINE.

MR. GALBRAITH.

1. One ton of coal is able to convert 288 cubic feet of water at 60° F. into steam at 250° ; calculate the evaporating power of the coal.
2. Water the temperature of which is 60° F., is converted into steam under a pressure of 100 lbs.; calculate how much per cent of the whole heat employed is utilized in external work.

3. Give the calculation for finding the numerical values of e and k for double-acting engines, the steam being cut off at seven-twentieths of the whole stroke.

4. The following are the data for a stationary double-acting condensing engine working at 100 H. P. : diameter 48 in., stroke 8 feet, revolution per minute 16; find the evaporation, steam being admitted during the whole stroke.

5. With the same data, and steam cut off at seven twenty-fifths of the stroke; find the evaporation, saving of fuel, and pressure of steam in the cylinder.

6. The following are the data for a locomotive engine having expansion gear :—Diameter of driving wheel, 6 feet; of pistons, 15 inches; stroke, 18 inches; and steam cut off at sixteen twenty-fifths of stroke. If the pressure of the steam in the cylinders as shown by an indicator be 60 lbs., find the speed on a level road, the weight of train being 90 tons.

7. Find the evaporation in this case.

8. What weight should be taken off the train in this case in order that it should ascend a gradient of 1 in 640, with the same velocity, evaporation, and expansion?

MIDDLE CLASS.

DR. DOWNING.

1. Calculate the number of cubic yards of earthwork in the following excavation :—

Heights at A = 0 ft. ; at B = 17 ft. ; at C = 21 ft. ; at D = 0 ft.

Lengths, from A to B, = 500 links (of the statute chain); from B to C = 750 links; and from C to D = 1000 links.

The slopes being $1\frac{1}{2}$ to 1, and the base 30 ft.

Each portion must be brought out separately, and in cubic yards.

2. Calculate the number of acres, roods, and perches, that the above excavation would require, exclusive of fencing; each portion must be brought out separately.

3. Calculate the number of square yards of soiling of slopes in the same excavation.

4. A segmental cast iron arch has a span of 210 ft. and a rise of 18 ft. 10 in. ; calculate the radius of the arc.

5. In an arch which is a semi-ellipse of 40 ft. span, and 10 ft. rise, calculate the vertical ordinate at 12 ft. from the springing.

6. Calculate the length of the curve in No. 5, and also give the construction by which you draw the joints of the voussoirs perpendicular to the curve.

7. A road, 24 ft. wide, is crossed over by a railway bridge 30 ft. wide from face to face;

The acute angle of intersection of the axes is 40° ;

The arch on the square section is a segment of a circle, span 24 ft., rise 8 ft.; calculate the angle β ; and, being designed for 50 voussoirs, calculate the angle β_2 , and the number of checks on the impost.

8. Calculate, from the above dimensions in No. 7, the angle ϕ , and give, with full description, the construction and method by which this angle is obtained for segmental arcs in the Text-book. The depth of the voussoirs is 2 ft.

9. The winding strips are to be placed 2 ft. 6 in. apart, measured on the extrado; give all the necessary dimensions for their construction, the parallel strip being 3 inches wide.

NOTE.—It is required in the answers to Nos. 7, 8, and 9, that all the calculations, and values of the lines necessary to the final result, be given very fully and clearly, and in a separate form.

10. Calculate the representative fraction in the following cases:—

$1\frac{1}{4}$ ths inches equal to one mile;

$1\frac{1}{4}$ ths miles equal to one inch.

11. On a French map, with which no scale is given, I find a certain distance is figured 402.292 metres, and this measures exactly $1\frac{1}{4}$ English inches; what is the scale of the map expressed as so many inches to a mile?

JUNIOR CLASS.

DR. SALMON.

A.

1. If $\tan A = -\frac{4}{3}$, find $\tan 2A$ and $\tan \frac{1}{2}A$.

2. Calculate the value of the cube root of 12.34 divided by the fifth root of 43.21.

3. Find to two places of decimals a root of the equation

$$\frac{2}{x-2} - \frac{3}{x-3} = \frac{4}{x-4}.$$

4. Between what whole numbers does a root lie of the equation

$$x^3 + 5x^2 + 10x = 1000?$$

5. One side AB of a quadrilateral is 1000 feet; the angles CAB , DAB are respectively 100° , 30° ; and the angles DBA , CBA are respectively 120° , 20° ; calculate the side CD .

6. Calculate the logarithm of $\frac{1}{2}$ in Napier's system.

7. Prove the formula for plane triangles,

$$\sin \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}}.$$

8. Prove the corresponding formula for spherical triangles.
 9. Trace the curve $y = x^2 - 5x + 6$.

B.

1. Differentiate

$$\frac{2}{x^2 \sqrt{x}} + (1+x^2)^{\frac{3}{2}} + \left(\frac{3+4x}{3-4x}\right)^{\frac{1}{2}}.$$

2. Differentiate

$$\log \left(\frac{1+x}{1-x}\right)^{\frac{1}{2}} + \log \sin x + \sin^{-1} \frac{x}{\sqrt{1+x^2}}.$$

3. Expand $\log \cos x$ by Maclaurin's theorem.

4. Find when $\frac{x^2 - 5x + 11}{x - 7}$ is a maximum or minimum.

5. Expand by the binomial theorem to four terms $(27 + 2x)^{\frac{1}{3}}$.

6. Integrate with respect to x ,

$$x^2 \sqrt{x} + (1+x^2)^{\frac{1}{2}} x^2 + \frac{x^2}{1+x^2}.$$

7. Integrate with respect to x ,

$$\frac{3+4x}{(x-2)(x-3)} + \frac{3+4x}{\sqrt{(x^2-5x+6)}}.$$

8. Draw the traces of the plane determined by three points, the heights of whose vertical projections above the ground line are respectively 5, 2, 13; the distances of whose horizontal projections from the ground line are respectively 10, 3, 7; and such that the distances measured parallel to the ground line, between the projections of the first and second, and second and third, are 6 and 9.

9. Draw through the first of these points a line perpendicular to the plane.

10. To a given cone draw a tangent plane parallel to a given one.

CHEMISTRY AND MINERALOGY.

DR. APJOHN.

1. How is muriatic acid made; and what is its action on metallic zinc, and on the peroxide of manganese?

2. How is nitric acid prepared; and what is the reaction in virtue of which silver is dissolved by it?

3. Give the formula of oil of vitriol, and explain the manner of its action, when heated, on metallic mercury.

4. Write the formula of oxalate of ammonium; explain how it is usually made, and the products formed when it is added to a soluble salt of calcium.

5. How would you test a solution of caustic soda for carbonate of sodium?

6. How is the analysis of atmospheric air effected?

7. Write the formulæ of the ferro and ferridcyanides of potassium, and give the action of the latter on chloride, and of the former on sesquichloride of iron.

8. The ammonia which may be developed from an ounce of sal ammoniac is conducted into an ounce of distilled water; what percentage of gas does the latter now include?

9. Explain the modes of producing nitrous and nitric oxides, and specify the characters by which they are best distinguished from each other.

10. How is sulphide of hydrogen made, and converted into sulphide of ammonium? Specify also, and illustrate, the uses of these reagents in grouping the metals.

11. Mention the crystallographic characters of the different systems, and specify the systems which are uniaxial and those which are biaxial.

12. What is meant by the degree of hardness of a water, and how is it determined?

13. A mineral from Connemara was found to consist of

Iron,	60.49
Sulphur,	39.51

100

Mention its formula and its name?

14. Write a list of the minerals which constitute the scale of hardness, and of those which constitute the scale of fusibility.

15. What is the formula and what the name of a mineral having the following composition?

Silex,	66.60
Alumina,	18.63
Zinc,	14.77

100

EXAMINATION FOR DEGREES IN MEDICINE.

DR. STOKES.

1. Compare hepatalgia and hepatitis as to their
Symptoms;
History;
Results;
Treatment.
2. Tumor, calor, rubor, dolor, are enumerated as characteristics of inflammation; which of them is most often found absent in local disease?
3. Is there any state of the tongue in fever indicative of an important local disease?
4. Indicate the immediate and remote dangers of purgation in the early state of fever.
5. A patient with extensive organic cardiac disease may become suddenly amaurotic; explain how this occurs.
6. State the causes of exophthalmus.
7. Is any special local disease necessarily connected with a discoloration of the skin?
8. Enumerate the causes of paralysis of the vocal cords.
9. State Virchow's views as to the so-called tubercular infiltration.
10. At what period in a case of permanent patency of the aortic valves are the characteristic phenomena, except the regurgitant murmur, absent?

INSTITUTES OF MEDICINE.

DR. LAW.

1. What is the generally-received explanation of the first sound of the heart?
2. How does pathology favour this explanation?
3. What percentage of carbonic acid gas in the atmosphere unfits it for respiration for man?
4. What is the minimum quantity of air that should be allowed for consumption by individuals confined in prisons, workhouses, schools, &c.?
5. What is Prout's classification of alimentary substances?
6. What are the two great purposes or ends for which food is taken into the body?
7. Describe the physical signs and constitutional symptoms of a case of phthisis pulmonalis from its earliest commencement to its fatal termination; and the ordinary *post-mortem* appearances as well as those which occasionally present themselves.

8. Describe the physical signs, constitutional symptoms, and *post-mortem* appearances of a case of acute phthisis pulmonalis.

9. What are the points of agreement and difference, in physical signs and constitutional symptoms, between a case of cirrhosis of the lung and one of phthisis pulmonalis?

10. Explain the mechanism of the hemorrhage which not unfrequently causes death in cirrhosis of the liver.

SURGERY.

DR. R. W. SMITH.

1. Injuries most likely to cause glucosæmia?
2. Affection of the eye resulting from glucosæmia; its peculiarities when so produced?
3. Supposed advantages of amylene over chloroform as an anæsthetic agent?
4. Laryngeal affections of a nervous character met with in adult life?
5. Diseases resulting from continued presence of a foreign body in the air passages?
6. Signs indicating that a foreign body has entered the windpipe?
7. Surgical affections in which carbonic acid is used as a local application?
8. Abscesses best adapted for being opened with caustic potass?
9. Treatment of fracture of the olecranon?
10. Symptoms of luxation of the head of the femur into the perinæum?

PHYSIOLOGY, AND PHYSIOLOGICAL ANATOMY.

PROFESSOR M'DOWEL.

1. Classify and describe the papillæ of the tongue.
2. Give an account of the excretory apparatus of the skin.
3. Describe the microscopical anatomy of the retina.
4. The minute structure of the human lung?
5. Enumerate the functions of the sympathetic nervous system, and give illustrations of each.

MIDWIFERY, ETC.

PROFESSOR SINCLAIR.

1. Describe the anatomical characteristics of the following deformities of the female pelvis, and give the diagnostic points of each in the living subject:—

- a. Ovate;
- b. Cordiform;
- c. Oblique (Nægele).

2. Under what circumstances and conditions, has it been deemed advisable to cause the uterus to rid itself, prematurely, of its pregnant contents? Give the various methods adopted for this purpose.

3. What are the most common causes of delay in the first stage of labour (head presentation)? The diagnosis and treatment of each?

4. The varieties of head presentations, *not* corresponding to the four positions of Naegele; which is the most impracticable, and why?

5. Mention the various modes in which ergot of rye, has been said to cause the death of the foetus *in utero* during labour. Which appears to be that, most consonant with the physiological action of the drug, and the anatomical structure of the uterus?

6. Write a short commentary, giving prognosis and treatment, on the following case:—

A woman, at full term, in the second stage of labour, head presenting. She complains of a fixed pain—increased on pressure—in a situation corresponding to the supra-pubic region; her stomach is irritable; thirst excessive; tongue dry and brown; pulse very quick; a foetid olive-coloured discharge issues from the vulva, yet the uterine action is brisk.

7. The differential diagnosis, constitutional and local, of advanced cauliflower excrescence, and simple fibrous polypus of the uterus; prognosis and treatment of the former?

8. The management of a labour—head presentation—complicated with prolapse of the funis, in,

a. First stage of labour;

b. Second stage?

9. Modes of resuscitating the newly-born infant?

10. The most suitable age for vaccinating infants; the method of performing that operation, and the circumstances which would induce you to postpone its performance?

MEDICAL JURISPRUDENCE.

DR. TRAVERS.

1. From what circumstances would you establish the diagnosis between the gastric irritation caused by a poison and the sympathetic affection termed *morning sickness* in a severe form?

2. State the possible causes of the death of the child at the time of birth, but excluding from consideration all those which involve the intention to destroy its life.

3. In what cases will the anatomical examination of the dead body be adequate to show that the death had been caused by a poison?

4. If there be concurring causes of death, by what will you be guided in determining which of them had prevailed?

5. Is *suicide* necessarily to be inferred, when a cutting instrument or other object capable of inflicting the observed injuries, is found firmly grasped in the hand of a deceased person?

6. How will you distinguish between the symptoms caused by an irritant poison and those resulting from an ulcer of the stomach having penetrated into the peritonæal sac?

7. Explain the principle of Professor Stas's process for detecting the organic alkalies in complex mixtures.

8. From what would you be induced to suspect *lead* poisoning in the chronic form? and with what diseases might it be confounded? Give the diagnostic marks on which you would depend.

9. What conditions of disease may suddenly terminate life? and how far will such causes of death be discoverable by dissection?

10. Can chloroform be detected within the bodies of those who have died after its inhalation? and, if so, by what means?

EXAMINATION FOR THE DEGREE OF MASTER IN SURGERY.

DR. R. G. BUTCHER.

1. Enumerate the several lesions comprised in the accident denominated Potts' Fracture.

2. Describe the mode of proceeding to be adopted for the restoration of the distorted parts in Potts' Fracture, and Dupuytren's apparatus for retaining them in position.

3. What are the immediate dangers that threaten a patient after the reception of a severe burn, and the mode of treatment applicable to each?

4. What dangers are to be apprehended after a severe burn during the suppurative crisis? and how may the patient perish at a remote time, when the injured part is nearly or even entirely healed?

5. Mention the different forms of syphilitic ulcers met with in the throat; localize each; and give its special characteristics.

6. What primary, secondary, and tertiary forms of syphilitic disease did Hunter describe?

7. In the treatment of phagedenic ulcer of the penis, what untoward symptoms may arise, demanding immediate interference on the part of the surgeon?

8. What is the pathology of anthrax? Mention Dupuytren's and Nelaton's views.

9. Describe the local and constitutional treatment of anthrax.

10. If anthrax be incised, what should regulate the extent and depth of the wounds? and what precautions should be taken during the time of and after their infliction?

PROFESSOR SMITH.

1. Diagnosis of femoral hernia?
 2. Symptoms and treatment of acute venereal iritis?
 3. Describe fissure of the anus, and its treatment.
 4. Give a full account of stricture of the rectum.
 5. Operation for double hare-lip?
 6. What is Potts' Fracture? Mention its characters, and the modes of treating it.
 7. Causes of death after lithotomy?
 8. Describe the different stages of morbus coxæ.
 9. Signs of luxation of the head of the radius forwards?
 10. Gangrene of the leg may follow compound fracture of the tibia, or may be caused by simple fracture of that bone, lacerating the anterior tibial artery; contrast the appearances and condition of the limb in the two cases.
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DESCRIPTIVE AND SURGICAL ANATOMY.

PROFESSOR M'DOWEL.

1. Enumerate the nerves which are distributed to the scalp, and mention the source from which each arises.
2. Describe the dissection necessary to expose the supra spinatus muscle up to its insertion.
3. Trace the circumflex humeri nerve; give its relations and distribution.
4. Mention the parts which lie superficial to the ulnar artery in the forearm.
5. Enumerate and classify the rotator muscles of the hip joint.
6. Contrast, in their relative anatomy, the great vessels and nerves in the upper and lower part of the popliteal space.
7. Enumerate the channels by which blood may reach the upper extremity after a ligature has been placed on the arteria innominata.
8. Contrast the urinary bladder, as to form and position, in the child and adult; and state the influence thence resulting on the operation of lithotomy.
9. The parts necessarily divided in the lateral operation of lithotomy?
10. The insertions of the tendons of the peroneus longus and brevis? What displacement are these tendons occasionally liable to, and how are the movements of the foot affected in consequence?

MEDICAL SCHOLARSHIP EXAMINATION, AND PREVIOUS EXAMINATION IN MEDICINE.

RELATIVE AND DESCRIPTIVE ANATOMY.

PROFESSOR M'DOWEL.

1. Describe the ligaments which connect the occipital bone and the axis.
 2. Describe the ligaments between the occipital bone and the atlas, and also those between the atlas and axis.
 3. Give a description of the cornea.
 4. Enumerate the nerves which supply the iris, and their several functions.
 5. Describe the dissection necessary to expose the temporal muscle and tendon.
 6. The muscular relations of the profunda femoris artery?
 7. Mention the anastomosing channels by which the blood may reach the lower extremity after ligation of the common iliac artery.
 8. The ligamentous connexions of the astragalus?
 9. Describe the epiglottis, and mention its connexions.
 10. Enumerate the veins which join the inferior vena cava.
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DESCRIPTIVE ANATOMY.

DR. E. H. BENNETT.

1. Name, in their order, the parts on which the radial artery lies in its course from the elbow to the wrist.
2. Describe the attachments and action of the external pterygoid muscle, and state its relations to the branches of the fifth nerve.
3. Trace the course and relations of the fourth cerebral nerve from its origin to its termination.
4. Mention the structures which compose the soft palate.
5. Give the relations of the brachial plexus of nerves to the axillary artery in its three stages.
6. What are the parts in contact with the pancreas, and how can it be most readily exposed?
7. Name the parts which must be removed in order to expose fully the bulb of the urethra.
8. Mention the anatomical characters which distinguish the three divisions of the small intestine.
9. What are the parts indicated by the following terms used in the de-

scription of the minute anatomy of bone, viz. : Haversian canal, lacuna, canaliculus, and Haversian system ?

10. What structures form the limits of the posterior mediastinum ? and how are its contents related to each other ?

MATERIA MEDICA AND PHARMACY.

DR. AQUILLA SMITH.

1. Define the pharmaceutical terms : maceration, infusion, decoction, and digestion.

2. Give the distinctive characters of the following salts :—*Magnesia Sulphas*, *Potassæ Sulphas*, and *Potassæ Tartras*.

3. Name the ingredients in "*Decoctum Aloes Compositum*," and state how much aloes is contained in one fluid ounce of the decoction.

4. How is camphor obtained ? and if it should be adulterated with hydrochlorate of ammonia, how would the sophistication be detected ?

5. Give the botanical names of the officinal drugs in the Natural Order *Melanthaceæ*.

6. Name the vegetable drugs which are supposed to exercise a special action on the liver.

7. Describe and explain the change which "*Hydrargyri Iodidum Viride*" undergoes in consequence of exposure to light, and state the means by which it can be restored to a state of purity.

8. Give the Natural Order, and place of growth of *Lobelia inflata*, its therapeutic action, and the doses of its preparations.

9. What is the composition of "*Pulvis Antimonialis*," and in what respect does it differ from the popular medicine termed "*James's Powder*" ?

10. Write a prescription in Latin, without symbols or abbreviations, for a diuretic mixture, with directions for use.

CHEMISTRY.

DR. APJOHN.

1. A person standing on the earth's surface may be killed as a consequence of two electric clouds discharging into each other ; how is this explained ?

2. How is the strength of a solution of a metallic salt undergoing electrolysis preserved constant in electrotype operations ?

3. How is sulphide of hydrogen developed, and how is it converted into hydrosulphuret of ammonia ? Give also the action of the former on tartar-emetic, and of the latter on sulphate of zinc.

4. Describe the processes employed in preparing iodide of potassium, and bromide of potassium ; and mention the tests for detecting iodic acid in the former, and iodine in the latter salt.

5. Give the process for preparing the liquor Antimonii Terchloridi, and describe the means of procuring from it a pure oxide of antimony, and how the latter may be converted into tartar-emetic. State also how, in the application of Marsh's test for arsenic, antimonietted and arsenietted hydrogen are to be distinguished from each other.

6. What is the process by which a given quantity of iodine may be entirely converted into iodate of potassium? State also the best mode of insulating the iodic acid of the latter salt, and how it is employed as a test for morphia.

7. Write the formula of permanganate of potassium, and explain the manner of its production when an aqueous solution of the manganate of potassium is subjected to ebullition. Give also the reaction of the permanganate on a solution of a protosalt of iron in the presence of free muriatic acid.

8. Write the formula of the triatomic alcohol of which mention is made in the British Pharmacopœia, and explain how it may be obtained in the making of Emplastrum Lithargyri.

9. Describe the process for the manufacture of sulphate of quinia, and the method of ascertaining whether it contains cinchonia or not.

10. Before urea can be determined quantitatively by Liebig's process, the urine must undergo two preliminary processes; what are these, and what are the objects they are intended to accomplish?

DR. E. PERCEVAL WRIGHT.

1. Describe the chief varieties of subterranean stems.
2. Describe the different parts of a three years' old exogenous stem, as seen in a transverse section.
3. Describe the chief transformations of leaves.
4. Mention some of the chief varieties of bracts.
5. Describe the different forms of Inflorescence.
6. Describe in detail the fruits met with in the Cruciferæ, Leguminosæ, Papaveraceæ, Primulaceæ, and Urticaceæ.
7. What forms of dehiscence are met with in the fruit of Datura, Ricinus, Viola, Hyoscyamus, and Papaver?
8. Describe the Pericarp in the Walnut, Peach, and Orange.
9. Give the chief characters of the Ranunculaceæ, and show in detail how this Natural Family differs from that of the Rosaceæ.
10. Write out in full the characters of the Plant marked A.

BEDELL SCHOLARSHIP EXAMINATION.

PROFESSOR O'MAHONY.

1. Give an abstract of the arguments by which the Irish language is proved to be of the Indo-European family.
2. Mention the chief points of difference between the Irish and Welsh.
3. Discuss briefly the question of the Antiquity of Letters in Ireland.
4. What are the principal characteristics of the Irish dialects?
5. "The Irish Gaelic," says Mr. Latham, "above most other languages, illustrates a Euphonic principle that modifies the Vowel of a word;" what is the principle referred to, and what is your opinion as to its value?
6. Does the change of the radical sounds of consonants by aspiration or otherwise furnish any presumption that a nation is becoming more or less civilized?
7. Dr. O'Donovan mentions a curious fact as to some consonants often aspirated in the modern Irish, but never found with any marks of aspiration in ancient manuscripts; what are the consonants, and what may be inferred from the fact?
8. What effect has the article on the initials of nouns, and what are the principal exceptions to the rule?
9. What are the principal rules for ascertaining the gender of nouns?
10. What are the particular rules for the formation of the nominative plural of the third declension?
11. In ancient manuscripts, certain particles often stand for the relative, and there are also certain compound forms of the relative; give examples.
12. What are the particles which aspirate the initial consonant of all regular, and most of the irregular verbs?
13. Explain the difference of meaning between *is*, *is é*, *is é sin*, and *is é sin*.
14. From what features of the verb did Shaw and Stewart attempt to make it appear that the Erse dialect is more original than the Irish? Show their opinion to be unfounded.
15. Write out the general and special rules for the formation of the infinitive mood.
16. Conjugate, affirmatively, negatively, and interrogatively the verb *faigh*.
17. Show how derivative substantives may be classed according to their terminations, and explain the manner of their formation.
18. What is the natural order of an Irish sentence, and what are the principal exceptions?

19. Write an abstract of the rules relating to the government of verbs, and mention the chief points of difference in this respect between the Ancient and Modern Irish.

20. When the article is expressed, what effect have the simple prepositions on the initials of nouns, and with what limitations?

Translate the following passages into Irish :—

1. Matt. xxiv. 6—13.
 2. John, xx. 1—10.
-

EXAMINATION FOR PREMIUMS IN IRISH.

PROFESSOR O'MAHONY.

1. Distinguish between *pill* and *iompoig*; and between *cluin* and *eipō*.

2. What are the ancient Irish words for Faith, circumcision, persecution, servant, slave?

3. Difference between *lean é* and *lean de*?

4. Give the derivation of *priobhámac* and *cómhalta*.

5. Write out the Irish terms for Sunday, Wednesday, Thursday, Christmas, Easter, Lent, Whitsunday, and explain their formation.

6. Give the simple and idiomatic meaning of the preposition *pá*, *pó*, or *paol*, with examples.

Translate into English the following verses, and correct any grammatical mistakes you may discover in the Irish :—

I.

Agur aifna laetibhin, ag méaduag do uibin na beirciobuil, d'eifnig monmup ná nDreagaad a nágaib na nEadruisigib, do bñig go cuigtaoi neimhion air a mbaintreabacuib ra minioibrdálaob laetemuil.

Agur d'fár bñatár Dó; 7 do mhéadag uibin na nbeirciobal go rónór a nleupálem; 7 d'ámluib cuib móir do na raigairc bo'n óperbeam.

Añ rin cuigabair a rcead bream áirige, noó a búbairc, Do eualamair féin é ag labairc bñatara marluigeadó a nágaib maoire, 7 Dó.

'Oir acá feiteadh díctóeallad gaó óreacáir ag fuiread pé poillriugad óloíne Dó.

'Oir acá an oreacáir pá murrancad an díomáoinir, ní b'a éoil péin, aóó air son an cé do óuir pá murrancad [é].

II.

Agur créad a déarúin ní ra mór? óir do díad a naimirir nó gáirir agum pé beir ag cpaobrígaioleab air gheéon, agur [air] b'árac, 7 [air] Sampron, 7 [air] Iepcae; [7 air] Dáibí fóir, agur Samuel, 7 [air] na fáidib:

Nod tré órebeam do buabuiú ríogaóba, do oibriú fíneun-tad, do gíóóuib na geallamnáda, do r'órap beoil na leóman,

Do m'ad neart na ceinead, do óuaid ar ó fáoban an ólóibin, tugad ó laige do láioiréad, do rínead neartmair a gac, do óuir a bceíteam pluaighe na neadórána.

Do glacabair na mná a mairb ó eiréirge air: do cérap b'pung eile mar an gcéadna, gan ruim aín a raorab aca; óum eiréirge buó fáirir b'fágáil b'óib:

Agur do deapbad b'pung eile pé r'gíge 7 pé r'giurruigib agur fóir pé géibeaíuib 7 pé príofán:

Do cloóad iab, do gearrad ó óéile iab, do cuiread oacugad oirréa, do marbad pé cloíbeaí iab: do b'abair air readóran a nuí ra nall a gcoicuib caorad 7 gabair; air mbeir b'óib a ríad-danur, b'a mbuaidnead, [7] b'a gcrad;

(Óream náir b'iu an raogal): ag buí amúga a b'áruigib, 7 [a] r'leibéib, 7 [a] b'cuimigib, 7 a nuaimuib talman.

III.

In c-ogum úc fil ir in cloid,
Imma corcoratar mór;
Dammareb fínb fíctib glonb,
Cian bab óuman in Ogom.

IV.

Tuaparcol ríog b'roga ríog,
O ríog Erenb cen im'ínm,
Deid n-ionair donna, deapga,
Ir deid ngoill can Gaebelga.

V.

O no faillirig tra aingel na coemtechta do anmair Abamair na píri-rea pláta nime 7 céó immur cecha h-anma iar ceóó a curp, ruc lair iar rín do achapenam ípíur inícheapraig co n-im-muib a rían ocur a éobernam. Ir é tra ceena tír píur a com-

pancatap, .i. ար n-dub n-borôa, ր e polomm poloirôci cen pem
 ար and. Զլենb lan bo tenib րոr anall; lappap and co teic
 արa h-opa րor cech lech; dub a h-ichtap; berğ a mebon ր a
 uachtap. Ocht m-biapta and; a pûli amail bpuçta tenciwi.
 Օրօւծet doni արr in n ցլենb; ցabarib onb ար co apoile: արb a
 mebon, րle umopra a chinb; ար րlorğ ie a armpure dia inot-
 çacê, ր n h-uili po peğut tapir.

EXAMINATION FOR PREMIUMS IN CIVIL LAW.

PROFESSOR ANSTER.

1. Nuncupative wills may still be made in England; state in what cases.
2. State the age before which, by the law of England, a will of either real or personal property is inoperative.
3. In the trial by jury as originally conducted, the verdict was arrived at in a different way from that which now prevails?
4. In trials *per pays* one principle seems to have subsisted through all the changes which it underwent; state what this was.
5. In a Roman Testament might a person appoint more than one heir?
6. In a Roman Testament, suppose part of the property not disposed of, what became of such residue?
7. Among what are called the internal solemnities of a Roman Testament there was one wholly indispensable; what was it?
8. State the number of witnesses to a Roman will framed in accordance with Justinian's Constitution.
9. You are told in the Institutes that the number required by Justinian's Constitution was the number which the Civil Law had previously required. The Prætorian Law required the seals of the witnesses. The Imperial Constitution required an additional formality; what was it?
10. Several advantages are stated of the Roman Military Testament. There was one serious disadvantage; what was it?
11. The inconvenience of the large number of witnesses to a Roman Will was avoided in one of two ways in modern countries, governed by the Roman Law or some modification of it; state how this was.
12. A father was obliged to institute as heir, or formally disinherit his son; was the rule the same with respect to a mother?
13. What was the rule with respect to a grandfather?
14. Give Justinian's definition of Liberty.
15. Do you regard this definition as adequate? if not, say in what it is inadequate.

16. Give Justinian's definition of Slavery.

17. Sir Edward Creasy quotes a passage from Guizot, in which, speaking of the interval from 1629 to the Restoration (1660), he states three great results of the Revolution in England; what were they?

18. State the date of the Petition of Right.

19. When was the Bill of Rights passed?

20. You are told in Mr. Heron's "History of Jurisprudence," that in Louis XIV.'s reign many attempts were made to reform the laws of France. The plan was to systematize, and to work into one ordinance, all the laws on each particular subject; state the ordinances proposed with this object, giving the names of the compilers, and the date of each ordinance.

21. The Institutes of Justinian have been chiefly formed from the Commentaries of Gaius; do you remember any statement in the Institutes to that effect?

22. Give Justinian's definition of Justice.

23. Give his definition of Jurisprudence.

24. Justinian states Private Law to be collected (*collectum*) from three sources; state the sources.

25. What is the definition you find in the Institutes of *Responsa Prudentium*?

26. Two ways are stated in which what Justinian calls *Civilia Jura*, as distinguished from *Naturalia Jura*, become changed—*mutari solent*; state the two.

27. Define *libertinus*.

28. There seems to be a distinction in the use of the words *libertus* and *libertinus*; state the distinction.

29. Define *Tutela*.

30. A person in *potestate patria* could be a *Tutor*; on what principles?

31. Define *Usufruct*.

32. Several modes are stated in the Institutes by which *Usufruct* ceased; state them.

33. *Error falsæ causæ Usucapionem non parit*. After stating this proposition, the author of the Institutes illustrates it by two cases which explain the principle; state the cases.

34. After Justinian's legislation on the subject of Wills, as particularized in the 10th *titulus* of the second book of the Institutes, could unwritten Wills have been so executed as to have legal validity?

35. What is *pupillaris substitutio*?

36. What is meant by "*inofficiosum testamentum*?"

37. Was the right to seek redress from the injustice of an "*inofficiosum testamentum*" confined to the children of the testator?

38. In the "*querela inofficiosi testamenti*" was insanity imputed to the testator who was accused as acting in violation of natural duty?

39. In the chapter *de donationibus*, when donations were divided into *donationes mortis causa* and *donationes non mortis causa*, quas INTER VIVOS appellamus, the division seems illogical; or, we should perhaps rather say, is calculated to lead to mistake as to the first class of *donationes*. How is this?

40. State the great and leading distinction between *codicilli* and *testamentum* in the Roman system.

41. State the words by which *fidei commissum* were ordinarily created.

42. Did it require the use of more than one of these words, some of which were precatory, some mandatory, to create a *fidei commissum*?

43. In the Roman system a man might bequeathe property not his own by legacy, or by *fidei commissum*; what was the effect of such bequest on his heir, or the person on whom the *fidei commissum* was imposed as a trust?

44. A. is instituted heir, and directed *restituere hereditatem* to B.; he does so, and thereby divests himself of the property; does he still remain heir?

45. State the distinction between constitutive and demonstrative testimony.

46. Mr. Merivale states in detail the artifices by which the first Emperor changed the republic into a monarchy, while still preserving, as far as possible, the language and the forms of the previous modes of government; state the process, as far as you can.

47. There are cases where the owner of property (*dominus*) has no right to alienate it; state the cases given in illustration of this in the Institutes.

48. In the Institutes you are told the provisions of the *Lex Julia* with respect to the *dotale prædium*; state the account there given of this *Lex Julia*.

49. A constitution of Justinian's made some changes in the law, remedying defects of the *Lex Julia*; state what his legislation on the subject was.

50. A *pupillus* lends money (on *mutuum*) without the *auctoritas* of his tutor; what is the effect of such act? Does the money become the property of the person into whose hands he has transferred it? has it been legally parted with by the *pupillus*? and if not, how is it to be recovered?

51. At what age could a Roman *Sui Juris* make a will?

52. A man, a prisoner of war in the hands of the enemy, makes his will; is such will valid should he return to his own country?

53. Define *necessarius heres*.

54. *Extranei heredes* are frequently spoken of; who were so called?

55. A man, under the Roman system, might bequeathe an article the property of another, which was then obliged to be purchased for the person to whom it was so bequeathed. We may suppose several cases of such bequest: a man, for instance, may bequeathe the property of another, believing it to be his own; is such bequest good?

56. Suppose the same thing given to two persons "*Titio et Seio meum fundum suburbanum do, lego,*" they take equally; but suppose one of them to die, or to refuse, what becomes of his share?

57. A man bequeathes property, his own, believing it to be another's; is such bequest good?

58. Can you point to any passage in the Institutes, which proves that they were drawn up after the Digest had been completed?

59. Can you point to any passage in the Institutes which shows them to have been drawn up for students of law?

60. In the Institutes you find a remarkable proof of the importance which Justinian himself gives of the Emperor's adhering to the old forms of the Republic?

61. Justinian tells you of some parts of the Roman Law being derived from the Civil Laws of Rome; others, from what he calls Natural Laws; others, from the *Jus Gentium*; to which of these sources does he refer the Law of Contracts?

62. To which of the three sources mentioned in the last question does he refer Liberty?

63. To which does he refer Slavery?

64. Give Justinian's definition of *Ingenuus*.

65. State the substance of the *titulus* in the first book of the Institutes "de Ingenuitate."

66. State Huberus's three maxims of the *Comitas gentium*.

67. A new body of law was created wherever Christianity was introduced; what were the proper sanctions of what has been called Christian Jurisprudence?

68. In the Roman law of inheritance you find the maxim, "*Quamdiu potest valere testamentum, tamdiu legitimus non admittitur.*" Translate, and explain the maxim.

69. Give Mr. Heron's definition of Positive Law.

70. Grotius says that few persons have treated of International Law ("*quod inter populos plures aut populorum rectores intercedit*"); among those few Cicero was one: state from Grotius the sources of this law, as described by Cicero.

71. Give Cicero's definition of War (*Bellum*).

72. Grotius objects to this definition; state his objection.

73. Grotius distinguishes the *jus gentium* from *jus naturale*, and says, "*sæpe in una parte orbis terrarum est jus gentium quod alibi non est;*" and he illustrates the statement by examples; what are the examples he gives?

DIVINITY PRIZE EXAMINATION.

JUNIOR CLASS.

PROFESSOR'S LECTURES.

1. Show the importance of recognising the principle of *intuition* in the course of the Theistic argument.
2. How should you argue in reply to Kant's scepticism in the case of Natural Theology?
3. Define the *natura naturans*, and the *natura naturata* of Spinoza.
4. What is Seneca's modification of the doctrine of the Metempsychosis?
5. It is futile to argue against the eternity of future punishments, that the sin is finite, and the suffering infinite? On what erroneous principle is Sir J. Stephen's argument on this subject conducted?
6. History refutes the assertion that a system of pure Monotheism would have produced all the grand moral results which Christians ascribe to their religion?
7. How does Bishop O'Brien criticize Paley's test of the probability of Miracles?
8. What is Archbishop Bramhall's remark in reply to the notion that foreknowledge implies causation?
9. What systems of philosophy form the foundation of Renan's attack on Christianity? Show this distinctly.
10. Write a note on the words, "Essence," "Person," and their Scriptural equivalents.
11. What is the objection to the use of the term *θεανδρικός*?
12. Professor Jowett misunderstands a passage in the writings of S. Gregory Nazianzen, with reference to the Atonement?
13. On what principle must we proceed when we seek to harmonize the Divine attributes? Give some instances.
14. Enumerate the leading examples of *voluntary* sacrifices supplied by Pagan history.

GREEK TESTAMENT.

DR. LEE.

1. What seems to be the true reading in the following passages:—S. Mark, iii. 29; S. John, i. 18; Acts, viii. 37; Rom. vii. 14; Gal. iv. 25 (translate this last passage with the altered reading).
2. Comment on the following forms:—*ἐκατόνταρχος* (S. Luke, vii. 6); *ἐκατοντάρχης* (Acts, x. 1); *τοῦ πλοῦτος* (Acts, xxvii. 9); *νοί* (Rom. vii. 25); *ἡμίσεως* (S. Mark, vi. 23).

3. Explain the epithet ὁ Κανανίτης, or Καναναῖος (S. Matt. x. 4).
4. Comment on the following constructions :—εὐαγγελίζεσθαι τὸν λαόν (S. Luke, iii. 18), and πτωχοῖς (iv. 18); παραινῶ ὑμᾶς (Acts, xxvii. 22); μὴ φοβ. ἀπὸ τῶν ἀποκτ. (S. Matt. x. 28).
5. Translate, so as to bring out the force of S. Paul's usual accumulation of prepositions with one and the same substantive, the following texts :—Rom. iii. 22, xi. 36; Gal. i. 1; Eph. iv. 6; Col. i. 16.
6. In the passage, Eph. vi. 17, by what arguments may it be shown that the genitive τοῦ Πνεύματος is appositional?
7. Write a brief note on Gal. iii. 19, 20, giving what you consider to be the meaning of ver. 20.
8. What explanations have been given of Gal. vi. 11?
9. Bring out the theological force of the passage, Phil. ii. 6-10.
10. Translate literally, so as to exhibit the strict signification of Gal. i. 6; Phil. i. 21, 22; ii. 25; Col. ii. 23.
11. Write a note on the distinctive meanings of the words, ψυχικός, σαρκικός, σάρκινος.
12. Discuss the question, What was "the feast of the Jews" mentioned in S. John, vi. 1?

Michaelmas Term.**EXAMINATION FOR LICENSES IN ENGINEERING.****DR. DOWNING.**

1. A wrought iron beam has the top and bottom flanges connected by 13 similar triangles; the depth of the beam is 9 feet, and the clear span 104 feet; the four left-hand vertices are loaded with 6 tons each. Calculate the pressure on each abutment from this load, omitting the weight of the beam itself.

2. Numbering the diagonals or sides of the triangles from 1 to 26, successively, draw out a list of those numbers which are in compression and in tension, respectively.

3. Calculate the amount of compression and tension, respectively, in all the diagonal bars; the two extreme right-hand and left-hand vertices being loaded with 6 tons each.

4. In a cast iron beam, 30 feet clear span, and 26 inches in depth, to carry a uniform load of 28 tons; calculate the area of the bottom and top flanges so that the coefficient of safety may be equal to 6.

5. Explain the apparent contradiction in the statement that timber beams have their strengths as the square of the depth, and those of wrought iron as the depth.

6. Being given the transverse area of the top or bottom flange of a beam at the centre point, the span, and the depth at the centre; it is required to give a formula, by which may be calculated the area requisite at any other point, so that the strain per square inch may be the same as at the centre; the load being uniformly distributed.

(a). When the depth is the same at all points of the span.

(b). When the depth is less at the point of the span selected than at the centre.

[The formula must be fully explained, and the principles on which each step depends fully stated.]

7. A water course has to be cut through ground of part of which the following is the section :—

Back.	Fore.	Distances.	
ft.	ft.	ft.	o. point A.
10.00	6.40	1140	„ B.
4.10	4.80	1080	„ C.
11.10	7.50	780	„ D.
9.20	5.90	1260	„ E.
6.10	6.75	1830	„ F.
6.00	5.85	510	„ G.

At the point A where the staff reading is 10.00 feet, the depth of excavation required for discharging the water is 7.00 feet, and at G the depth must be 5.30 feet.

Calculate the depth which must be sunk at each point, and also what the rate of fall will be when finished; the distances are from point to point.

8. In a wrought iron beam, 120 feet clear span, and 10 feet deep in the centre, to carry a uniform load of one ton and a quarter per foot of span; calculate the area of the bottom and also of the top flange at the centre, so as to satisfy the inspecting officer of the Board of Trade.

9. If the depth at the point situated 20 feet from either abutment be 9 feet; calculate the area of the top and of the bottom flanges, so that the strain per square inch may be the same as at the centre.

10. Compare the relative tendency in a boiler or water pipe, under internal pressure, to split longitudinally or tear asunder in the transverse section, working out fully the formula for each, and showing the approximation by which the result is obtained.

11. In a suspension bridge, 700 feet span, and with a dip of the chains of 70 feet; calculate, by the approximate formula, the length of the chain, using two places of decimals in the final result.

12. If the total section of the chains (supposed uniform throughout) be 450 square inches; calculate the weight of iron in them, and the horizontal tension per square inch at the centre and at the upper point of attachment in No. 11.

13. State the weight which may be assumed for the roadway, and for the greatest possible number of men standing close together, in pounds per square foot; and if the width of the roadway in No. 11 be 28 feet, compute the strain this load will bring on the chains at the centre, and at the upper point.

14. Describe fully the method of ranging the centre line of the Woodhead Tunnel over the surface of the ground, and also the manner of transferring the range to the bottom of the shafts, and give a sketch of the transverse section of this tunnel.

15. Describe the manner of transferring the levels from the surface of the ground to obtain the formation level at the bottom of the several shafts.

16. Give the arguments *pro* and *con* in comparing one large tunnel for a railway with two smaller for a single line each, as stated by Sir J. Burgoyne; and explain by sketch the mode of carrying on the excavation of the Woodhead Tunnel, and securing the ventilation.

17. Describe fully the sinking of, and construction of the shaft in the Woodhead Tunnel; and the principle on which their several distances apart were decided upon.

18. Two methods of measuring the velocity of water issuing from an orifice in the side of a vessel are given; describe these fully, and state the theorem of Torricelli.

19. In a rectangular orifice for discharging water—If h be the depth from the surface to the upper side, and H the depth to the under side of the orifice, give the exact formula for the discharge, and deduce it step

by step; and also give the usual approximate formula for the discharge through the same orifice, and explain by a diagram the difference between the two; the width of the orifice being l , and the coefficient = m .

20. If, in the last question, $h = 0$, give the expression for the discharge, and also for the mean velocity, and for the depth from the surface at which it is situated?

21. In a channel whose transverse section is a trapezium, the depth being 5 feet, and the mean width 25 feet, the ratio of the slopes of the sides being 2 to 1; calculate the hydraulic mean depth, and the discharge with a fall of $\frac{1}{1780}$.

22. Calculate the amount of excavation in a cutting of the following dimensions, which have been taken from the Parliamentary section:—

	Feet.
Depth at A	= 0
„ B	= 17
„ C	= 30
„ D	= 21
„ E	= 0,

and the distances being, from A to B 200 feet, from B to C 360 feet, C to D 400 feet, and from D to E 300 feet; the slopes being one and a quarter to one, and the base 30 feet. To obtain credit for this question, each part must be brought out in cubic yards.

23. In Macneill's Tables you will find, in the First Series of Tables, with base 28 feet, and slopes $2\frac{1}{4}$ to one, and with end heights of 25 feet and 42 feet, the tabular number 140.88. How was this number deduced? and give the work fully. How is it to be used? And calculate what the tabular number will be with end heights of 27 feet and 21 feet? the base and slopes being the same as above.

24. In the Second Series of Tables with slopes of $2\frac{1}{4}$ to 1, and base 1 foot, we have the numbers—

Multiply.	Add.
0.6481	25.694

at the intersection of the end heights, 20 and 15; explain these numbers, and show how they were calculated, and how they are to be applied to determining the cubic content.

25. Give the list of the different kinds of masonry used in an ordinary railway bridge, stating the different parts of the structure in which they are severally applied; and give the specification of each kind, and its price.

26. Give a specification of brickwork, selecting from the various Works in the Text-book.

27. Draw up a specification of a turnpike road on Telford's method of construction, and also give that of the road parallel to the Lifey walls.

28. In a river having a mean breadth of 70 ft., and its depth being 2.5 ft., with an inclination of $\frac{1}{1640}$; calculate the hydraulic mean depth, the velocity, and the discharge.

In channels which are very wide in proportion to their depth (as in this question), an approximation may be made as to the form of the transverse section when it is a trapezium, and also as to the hydraulic mean depth; state and explain by diagrams what they are?

29. If in the river mentioned in the last question a weir was constructed of such dimensions, that the depth of water immediately above it was 6 ft.; calculate, by the approximate method, the distance up stream to which the raising of the water at the weir will affect the level of the surface of the stream.

30. In a stream discharging 476.4 cu. ft. per second, and having a fall of $\frac{1}{1780}$, it is found that the soil will not bear a greater velocity than 3 ft. per second; calculate the depth, and the top and bottom widths required for the channel, which is a trapezium in transverse section, and having side slopes of $1\frac{1}{2}$ to 1.

31. The depth of a channel is 4 ft., and the side slopes make an angle of $33^\circ 41'$ with the horizon; calculate the area of the transverse section when of the best discharging form, and prove the formula used.

32. Explain the construction of Bidder's Tables for Earthwork, and state the figures which will be found in them for the numbers 20 and 15 feet.

33. Give a specification for a timber bridge, on timber piles, to carry a line of railway.

34. A wrought iron beam, 120 feet in clear span, and 10 feet in depth, is loaded so as to produce an average strain of 6 tons per square inch in the bottom, and 4 tons in the top flange; calculate the deflexion in the centre by the approximate method which has been pointed out. The beam is supposed to be in a horizontal right line when unloaded. The result to be given in inches, to two places of decimals.

35. Calculate the ultimate strength of a cast iron pillar, 20 feet high, 12 inches external diameter, and 1 inch in thickness.

36. A bar of fir timber, 2 inches broad, and 2 inches deep, and 6 feet clear between the supports, breaks with a load of 1000 lbs. uniformly distributed; calculate the breaking weight of a beam of this timber, 8 inches broad, and 24 inches deep, and the clear span 30 feet, when uniformly loaded.

37. Give a sketch of the concrete wall erecting by Mr. Stoney beyond the Graving Docks, North Wall; stating the proportions of the materials used, and the mode of founding and building the wall. Give the cost comparing this with the ordinary coursed rubble.

MR. TOWNSEND.

THEORETICAL MECHANICS.

1. A straight horizontal beam AB , supported but not fixed at both ends A and B , is loaded with several weights P, Q, R, S , &c., applied at different points E, F, G, H , &c.; determine the entire bending moment M due to their combined action at any point of it X .

2. If M have equal magnitudes at the points of application E and F of any two consecutive weights P and Q , show that it has the same magnitude at all points of the beam intermediate between E and F .
3. Investigate in general the condition that a strained elastic beam of any transverse section should undergo no deflection at any point in the direction perpendicular to the plane of the bending moment at the point.
4. Whatever be the shape of the transverse section of the beam, show that its directions of greatest and least strength to resist fracture by bending are at every point at right angles to each other.
5. Investigate Dr. Hart's construction for the pressure of a bank of earth against a vertical wall, the surface of the earth being inclined at any angle to the horizon.
6. In the two particular cases where the surface is horizontal, and inclined at the natural slope of the earth, show that the construction in question gives immediately the ordinary formulæ for the pressures in those cases.
7. A weight rests on a rough inclined plane; given the angles of inclination and friction, show how to draw to scale the magnitudes of the several forces which, acting in different directions, suffice just not to move it.
8. Investigate the relation between the power and resistance for equilibrium in the screw, taking into account friction; and determine, for a given coefficient of the latter, the limiting angle of inclination of the thread consistent with the possibility of working the machine.
9. A body of any form, symmetrical with respect to a plane, revolves round a fixed axis perpendicular to the plane; given the particulars of the body and motion, determine the entire pressure on the axis resulting from the rotation, and state when it is nothing.
10. If, in the same case, the body strike against a fixed obstacle, determine the shocks on the axis and obstacle at the moment of collision, and state the condition that the former should be nothing.

PRACTICAL MECHANICS.

1. A wall of limestone (sp. gr. = 2.6), 2 ft. thick and 20 ft. high, sustains at every foot of its length a pressure P applied centrally along its summit, and inclined $52^{\circ} 30'$ to the horizon; required in tons the limiting value of P consistent with its equilibrium.
2. Calculate in feet the limiting height to which a wall of the same thickness and material could be raised so as to sustain without support the pressure of water against the entire surface of either vertical face.
3. Calculate again in feet the limiting height to which it could be raised so as to sustain without support the pressure of earth (sp. gr. = 1.7) receding from its upper internal edge at its natural slope of 45° .
4. The supporting chains of a suspension bridge whose span and dip are 500 and 50 ft., respectively, undergo a common extension of 1 ft. along their entire length; calculate in inches the central depression thence resulting.

5. Calculate, in the same case, the relative variations in the central and terminal tensions of the chains.

6. A horizontal elastic beam, 20 ft. long, 12 in. deep, and 6 in. thick, supported but not fixed at both extremities, undergoes a central deflection of 1 in. under the action of a ton weight placed at its middle point; calculate the modulus of elasticity of the substance composing it.

7. If, in the same case, the same deflection would be produced in the beam, supposed unloaded, by its own weight; calculate the specific gravity of the substance composing it.

8. A railway train, moving at the rate of 25 miles per hour, runs through three quarters of a mile before it stops, when the steam is shut off, and the breaks applied; calculate the resistance in pounds per ton of its weight.

9. If the train, moving at the same rate round a curve of one-eighth of a mile radius, exert no lateral pressure against the rails, supposed 5 ft. apart; calculate the difference of their level in inches.

10. A circular plate, 2 ft. in diameter, 2 in. thick, and 2 cwt. weight, revolves round its axis five times per minute; calculate in foot pounds the entire amount of work accumulated in it.

STEAM ENGINE.

MR. GALBRAITH.

1. How many cubic feet of water can be converted into steam at 250° by one ton of coal whose evaporating power is 7.16?

2. How many cubic feet of steam will be produced in this case?

3. Calculate the mechanical effect of this amount of evaporation in horse-power.

4. The diameter of the cylinder of a non-condensing engine is 17 inches, the evaporation is two-thirds of a cubic foot per minute, the velocity of the piston is 300 ft. per minute, and the steam is cut off at two-thirds of the stroke; calculate the horse-power.

5. In this case find the pressure above the piston before the steam is cut off.

6. If the pressure in the boiler be 60 lbs., find with the same data the maximum useful effect in horse-power; also the velocity of the piston.

DR. HAUGHTON.

*1. A course of traverse dialling gave the following results; calculate the length and bearing of the end:—

No.	Draft.	Azimuth.
1. . .	95 fm.	20° E. of N.
2. . .	207 „	49 S. of E.
3. . .	51 „	34 W. of N.
4. . .	101 „	19 W. of N.
5. . .	11 „	9 W. of N.

*2. It is intended to sink a shaft on the end of a level driven from Pendarves' shaft, and the following is the survey from the centre of Pendarves' shaft to the end of the level :—

No.	Draft.	Azimuth.
1. . .	45 fm. . .	3° W. of N.
2. . .	24 $\frac{1}{2}$ „ . .	7 $\frac{1}{4}$ N. of E.
3. . .	18 „ . .	8 $\frac{1}{2}$ N. of E.
4. . .	49 „ . .	E.
5. . .	30 „ . .	12 S. of E.

Find where the new shaft should be sunk.

3. Name the mineral described thus by Dr. Smith, giving your reasons :—

“ Hardness = 5. Powder, dark iron-grey. On charcoal it emits some white fumes with slightly pungent odour, and fuses readily into a black bead, not magnetic, which is brittle, and breaks with metallic lustre; this bead, fused with borax, colours it deep blue in the outer flame, and alloys with the platinum wire; and in the inner flame the blue colour is changed into a brownish amethyst shade.”

4. Give the blowpipe characters of Pitchstone and Basalt.

5. Give the distinguishing characters of the Nautilidæ, Orthoceratidæ, and Ammonitidæ.

6. Give the characters of Terebratulidæ, Spiriferidæ, Rhynchonellidæ, Orthidæ, and Productidæ.

7. State the Geological History of the principal families of Cephalopods and Brachiopods.

8. In what respects do the marsupial bones of the Dinotherium differ from those of living Didelphs?

* *Questionus thus marked count double.*

CHEMISTRY AND MINERALOGY.

DR. APJOHN.

1. When a water becomes turbid on boiling, the precipitate may include a mixture of the carbonates of lime and magnesia with peroxide of iron; state the forms in which these materials existed in the water before it was boiled, and the manner of making an analysis of the precipitate.

2. The gases liberated from a water by boiling it may include oxygen, nitrogen, carbonic acid, and sulphide of hydrogen; how would you determine the volume of each in such a mixture?

3. Describe the methods usually adopted for preparing sulphide of hydrogen, and explain its action upon a mixed acidulated solution of sulphate of copper, sulphate of zinc, and the proto and persulphates of iron.

4. If the chlorine developed from w grains of an oxide of manganese, when conducted into an aqueous solution of chloride of barium and sulphurous acid, gives a white precipitate, whose weight is w' grains; what is the amount of pyrolusite corresponding to 100 grains of the oxide of manganese which has been the subject of experiment?

5. There is an ammoniacal salt, which when melted gives off nitrous oxide, and an ammoniacal salt whose aqueous solution, when boiled, gives off nitrogen; what are the salts in question, and what the explanation of such results?

6. Some specimens of arsenical oil of vitriol can, and others cannot, be deprived of arsenic by simple distillation; what is the cause of this difference?

7. What are the methods usually adopted for preparing pure phosphoric and arsenic acids; and how, in the case of a mixed solution of the two, may the amount of each be determined?

8. What, according to Vicat, are the essential constituents of a hydraulic lime? and how would you determine the amount of active and inactive silex in it?

9. Explain the methods usually adopted by chemists for separating iron from alumina, iron from manganese, nickel from cobalt, and antimony from lead.

10. The amount of bromine in an aqueous solution may be determined by a volumetric process; how is it conducted?

11. A metallic ore analyzed by Rose gave the following results:—

Sulphur,	21.53
Antimony,	37.94
Lead,	40.53

100.00

what is the formula, and what the name of the ore, and how was its analysis effected?

12. A silicate was found to consist of

Silex,	35.64
Peroxide of iron,	30.00
Protox. manganese,	3.02
Lime,	29.21
Potash,	2.35

what is the probable formula of the mineral. Mention also its name, and its crystalline system?

13. A hexahedron may be modified in various ways—

- a. By planes tangential to the edges;
- b. By planes bevelling the edges;
- c. By planes tangential to the angles;
- d. By three planes laid on the angles, and resting symmetrically on the edges;
- e. By three planes on angles resting symmetrically on the faces;
- f. By six planes on angles resting in pairs symmetrically on the edges.

Name the simple forms corresponding to these different secondary planes, and give notation of each according to Rose.

14. Give the notation of the hemihedral forms characteristic of the third system, and mention the name of a single mineral occurring in each of such forms.

15. There is a form in the fifth system to which there is no parallel in the fourth; how is it named, and what is Rose's notation for it?

SCHOOL OF ENGINEERING.

SENIOR CLASS.

STEAM ENGINE.

MR. GALBRAITH.

1. If Boyle and Mariotte's law were applicable to steam, calculate the mechanical effect due to the evaporation of one cubic foot of water.
2. Prove the following expression for the work done, including that due to expansion :

$$W = w (1 + \lambda \log E).$$

3. Prove that the maximum useful effect corresponds to the least velocity.
4. The diameter of a condensing engine is 40 inches, the boiler-pressure is 65 lbs., the evaporation is 2 cubic feet per minute, and the expansion is ($h = 56$); find the velocity corresponding to the maximum useful effect.
5. Find the maximum useful effect in this case expressed in horse-power.
6. With the same data, calculate the horse-power if the velocity be raised to 250 feet per minute.
7. Calculate, in this case, the pressure of steam in the cylinder.

MIDDLE CLASS.

DR. DOWNING.

1. An oblique bridge has to be constructed to carry a private road over a canal. The arch, on the square section, is a segment of a circle 24 feet span and 4 feet rise, the angle of intersection of the axes of the road and canal is 30° :
 - a. Calculate the value of the angle β , giving distinctly, and separately, the several successive steps of the computation.
 - b. The number of voussoirs being 43, and the external width of the bridge 18 feet; calculate the length of the impost, the divergence of the courses, and the number of courses to spring from the abutment.
 - c. Calculate the adjustment of the angle β , and explain the approximation used in using it.
 - d. Draw neatly the construction for determining the angle of the coursing joints on the extrado, and give the value of the angle ϕ in this bridge; the depth of the voussoirs being 2 feet.
 - e. Calculate the adjusted value of the depth of the point to which the face joints of the voussoirs converge.

f. The twisting rules being set 3 feet apart, and the parallel one being 2 feet long by 3 inches broad; calculate the dimensions of the wide end of the other.

2. Calculate the land required for the base of a reservoir embankment of the following dimensions; the width on the top 25 feet, and the slopes two and a half to one:—

The depths being, at $A = 0$, at $B = 24$ feet, at $C = 38$ feet, at D and $E = 50$ feet, at $F = 40$ feet, at $G = 0$. The distances being from A to B , 400 feet; B to C , 600 feet; C to D , 300 feet; D to E , 400 feet; E to F , 500 feet; and F to G , 200 feet.

Each part must be brought out separately in acres, roods, and perches, to obtain credit for the answer.

3. Calculate the areas of the two slopes of the bank in No. 2; the result of each part, and the whole, being given in square yards.

4. Give Mr. Cotton's rule for the area of the side slopes with the inclination of $1\frac{1}{2}$ to one, and the proof of it.

5. A circular culvert 3 feet diameter, and with the ring of brickwork 9 inches thick, is to be constructed under an embankment 20 feet in depth, and having 30 feet width on top, and slopes of two to one; calculate the number of cubic feet of brickwork in the culvert.

6. An elliptical arch of 30 feet span is required to have a height of 8 feet above the horizontal line of the springing at a point 6 feet from either abutment; calculate the rise of the arch, and the length of the curve, both in feet and decimals.

THEORETICAL MECHANICS.

MR. TOWNSEND.

1. A uniform beam AB , whose entire weight = W , is suspended from a fixed point C by two cords AC and BC attached to its extremities A and B ; required the tensions on the cords, and the pressure on the point.

2. Two uniform beams AC and BC , connected by a hinge at C , and having a common weight per unit of length = w , are attached by their free extremities to two fixed points A and B in the same horizontal line AB ; required the pressures on the points, and the stress on the line.

3. If A and B be the two hinges, and C the centre of gravity, of a door whose entire weight = W ; required, in magnitude and direction, the pressures on A and B .

4. A weight W , resting on a smooth inclined plane, is held in constrained equilibrium by an applied force F , and by the reaction of the plane R ; if α and β be the inclinations of the plane and force to the horizon, required the values of F and R .

5. Compare the ratios of the power to the resistance in the two species of Burton pulley, both in the ordinary and inverted positions of the systems; the number n of moveable blocks being the same in each case.

6. If a prism of any shape be wholly immersed in a fluid pressing it equally on every unit of area of its surface; show, on mechanical principles, that it will rest in equilibrium in every position.

r

7. Define the "centre of pressure" of a plane area immersed in any fluid; and determine its position for a triangle immersed in water, of which one side is horizontal, and the opposite vertex at the surface of the water.

8. Explain the best methods with which you are acquainted of determining the specific gravities—(a) of a solid heavier than water; (b) of a solid lighter than water; (c) of a liquid.

9. Required, in statical measure, the force F which, acting freely for a given time T upon a given weight W , will cause it—(a) to acquire a given velocity V ; (b) to run through a given space S .

10. Required, in statical measure, the centrifugal force F of a given weight W which, revolving uniformly, performs k revolutions per second in a circle of n feet radius.

11. A weight P , descending one inclined plane, draws another weight Q up another inclined plane by means of a connecting cord passing over the common summit of both planes; if α and β be the inclinations of the two planes, required the tension on the cord.

12. A mass M moving with a velocity V overtakes another mass M' , moving directly away from it with a lesser velocity V' ; if e be their coefficient of relative elasticity, required their respective velocities v and v' after they separate again.

JUNIOR CLASS.

DR. SALMON.

A.

1. Solve the equation

$$\sqrt{3x} = 5 + \sqrt{x - 11}.$$

2. Multiply the square of $2 + \sqrt{-3}$ by $1 - 4\sqrt{-3}$.

3. Divide the angle 100° into parts such that the tangent of one shall be five times the tangent of the other.

4. Find the angles and the area of the triangle whose three sides are 729, 854, 643.

5. Explain how the height of a balloon might be calculated from observations made at three points on a right line

6. Establish the relation which connects the cosines of the angles of a plane triangle.

7. From the formula

$$\sin x = x - \frac{x^3}{1.2.3} + \frac{x^5}{1.2.3.4.5} - \&c.,$$

calculate the sine of one degree to three places of decimals.

8. Trace the curve

$$y = \frac{(x+1)(x-3)}{x+3}.$$

B.

1. Differentiate

$$x\sqrt{x} + \sqrt{\frac{3+2x}{3-2x}} + \sin^{-1}\left(\frac{2x}{1+x^2}\right) + \log \sec x.$$

2. Expand $e^{\sin x}$ by Maclaurin's theorem.

3. Find the value of $\frac{x^2 + 2 \cos x - 2}{x^4}$ when $x = 0$.

4. Find when u is a maximum or minimum—

(a) if $u = x^m(a-x)^n$;

(b) if $u = \sin x \cos^2 x$;

(c) if $u = \frac{a}{\sin x} + \frac{b}{\cos x}$.

5. Expand by the binomial theorem to four terms $(9 - 2x)^{\frac{1}{2}}$.

6. Integrate with respect to x ,

$$\frac{1}{x^2 \sqrt{x}}, \quad \frac{1}{4-2x}, \quad \frac{1}{4-x^2}, \quad \frac{1}{\sqrt{4-x^2}}, \quad \sin^2 x.$$

7. Two planes meet the ground line in the same point; if a perpendicular be erected to the ground line at a distance 8 from that point; the two horizontal traces meet that perpendicular at distances, respectively, 8 and 4, and the two verticals at distances, respectively, 4 and 8; construct their intersection.

8. Make the same construction, taking the two verticals on opposite sides of the ground line; so that in the figure the vertical which meets at the distance 4 coincides with the horizontal trace of the other plane.

9. Construct the angle at which two given lines intersect.

10. Show how to draw a tangent to a helix at any point.

ENGINEERING CLASS.—ENTRANCE EXAMINATION.

DR. SALMON.

1. Cut a line so that the rectangle under the whole and one segment shall be equal to the square of the other segment.

If the whole line be 12 feet long, what will be the lengths of the segments?

2. If two equal triangles have an angle in each equal, the sides about the equal angles will be reciprocally proportional?

If the sides of one triangle be 6 and 8, and if one side of the other be 12, what will be its other side?

3. If a quadrilateral be inscribed in a circle, prove that the rectangle under the diagonals is equal to the sum of the rectangles under the opposite sides.

4. Find the length of the mean proportional between lines whose lengths are 0.27 and 0.0243.

5. What is the value of x^0 and of x^{-n} ? Give your reasons.

6. What are the logarithms of 0, of 1, of $\frac{1}{2}$, and of 1.28? It is given that the logarithm of 2 is 0.30103.

7. Solve the equations

$$x + y = 13, \quad x^2 + y^2 = 86.5.$$

8. Divide $a^2 - b$ by $a^{\frac{1}{3}} - b^{\frac{1}{3}}$.

9. Solve the equations

$$\frac{2+x}{5} - \frac{3-x}{4} = 1,$$

$$\sqrt{3x} = 5 + \sqrt{(x-11)}.$$

10. If $\sin A = \frac{3}{5}$, $\sin B = \frac{5}{13}$, find $\sin(A - B)$.

UNDERGRADUATE HONOR EXAMINATION PAPERS.

Michaelmas Term.

JUNIOR SOPHISTERS.

Mathematics.

A.

DR. SALMON.

1. Find the law of force when a circle is described, the centre of force being anywhere inside it. What will the law be when the centre is on the circumference?
2. Find when twilight is shortest at a given place.
3. How can the amount of the variation of the compass be ascertained at sea?
4. Find formulæ of reduction for integrating $e^x \cos ax \, dx$.
5. Find the least distance between the conjugate foci of a lens.
6. Explain the phenomena of the rainbow.

MR. W. ROBERTS.

7. Show how to clear an observed lunar distance of the effects of parallax and refraction.

8. Prove Brinkley's approximate formula for refraction,

$$R = \frac{m-1}{\sin i''} \tan z - \frac{m-1}{\sin i''} \frac{l}{a} \tan z \sec^2 z.$$

9. A hemispherical bowl of given weight W floats upon a fluid with one-third of its vertical radius below the surface; required the weight W' that must be put into it to make it float with two-thirds of its radius below the surface.

10. Find when the total deviation of a ray in passing through a prism is a *minimum*.

11. Find the equations of equilibrium of a particle on a curved surface.

12. Find the series which gives the time of oscillation of a heavy particle in a circular arc.

MR. CONNER.

13. If a body describe an ellipse, the centre of force being at an extremity of the axis major, find the law of force in terms of the radius vector, and the angle it makes with the axis.

14. Find the time of describing a given arc of a parabola measured from the vertex, the force being directed to the focus.

15. Show how a small azimuthal error in the adjustment of a transit instrument may be corrected by observation of a circumpolar star.

16. Find the lateral pressure on a segment of a sphere filled with water.

17. Show how the height and longitude of the nonagesimal point at a given time and place may be found.

18. Find the curvature of the plano-convex lens of glass ($\mu = \frac{3}{2}$) which is best suited to remove the effect produced on vision by immersion of the eye in water ($\mu = \frac{4}{3}$).

B.

DR. SALMON.

1. Assuming the Moon's periodic time to be 27 days, and her distance from the Earth's centre to be 60 times the Earth's radius, what will be the space fallen from rest in one second under the influence of the same force at the surface of the Earth, the force varying inversely as the square of the distance?

2. How does the change of a star's altitude near the meridian vary? Given three altitudes near the meridian, and the intervals between the times of observation; find the meridian altitude.

3. Find the caustic produced by refraction at a plane surface.

4. Find the centre of pressure of a circular area just immersed in fluid whose density varies as the depth.

MR. W. ROBERTS.

5. A ray of light is incident on a refracting medium, terminating in a curved surface of given form; find the general equation of the refracted ray.

6. Let h be the height due to the initial velocity, α the elevation, and s the arc of the parabola included between the point of projection and the highest point; it is required to prove that

$$e^{\frac{s - h \sin \alpha}{h \cos^2 \alpha}} = \tan \left(\frac{\pi}{4} + \frac{\alpha}{2} \right).$$

7. Form the differential equation of the movement of a heavy particle in a vertical circle, in a medium whose resistance is proportional to the velocity.

8. Find the entire length of the curve whose equation is

$$x^2 + y^2 = a^2.$$

MR. CONNER.

9. A body setting out from a state of rest is constrained to describe a hyperbola, and is acted on by two forces at the foci, which vary inversely as the square of the distances; find the pressure on the curve.

10. Show how the inclination of the Sun's axis to the ecliptic may be found by observation of spots on his disc.

11. Find the distance at which two lenses of given form and material will be achromatic for parallel rays.

12. Find the spherical aberration produced by a double convex lens of equal curvatures on parallel rays in terms of the aperture and focal length.

Experimental Physics.

HEAT.

DR. APJOHN.

1. What is the exact relation between the coefficient of absolute expansion of a liquid, its coefficient of apparent expansion, and the coefficient of absolute expansion of the material composing the vessel in which the apparent expansion was taken?

2. A glass ball was found to contain, of a liquid at 32° , 568 grains, and when raised to 100° it retained but 558 grains; what is the coefficient of apparent expansion of the liquid, and what also the coefficient of its absolute expansion, assuming the coefficient of the linear expansion of glass to be 0.000010093?

3. A ball of platinum weighed in mercury at 0° Centigrade loses of its weight 50 grammes, and at 60° loses 49.5415 grammes; from these data deduce the coefficient of the cubic dilatation of platinum, assuming the density of mercury at 0° to be 13.6, and the coefficient of the cubic dilatation of mercury to be $\frac{1}{8100}$.

4. What are the relative weights of platinum and mercury which should be used in order that, when placed at 32° in a vessel of iron, the apparent expansion should be 0° :—s. g. of mercury = 13.6; s. g. of platinum = 21; coefficients of cubic expansion of mercury = 0.0001815; of platinum = 0.0000257; of iron = 0.000366?

5. A glass balloon containing 5 cubic feet of gas at 32° , and under a pressure of 29.212, is heated to 212° , the gas as it expands being permitted to escape; at the close of the process the pressure is only 29.528; from these data calculate the weight of the carbonic acid which has been expelled. The coefficient of the cubic dilatation of glass is 0.0000153, and that of carbonic acid 0.00206. The weight of a cubic inch of air at 60° , and under a pressure of 30", is 0.3103 of a grain, and the specific gravity of carbonic acid is 1.52.

ELECTRICITY AND MAGNETISM.

MR. GALBRAITH.

6. If a Leyden jar be discharged on an insulating stand, what is the electric condition of each armature after the discharge?

7. According to what law is a charge of electricity dissipated? And from it derive an expression for the charge after an interval of t minutes.

8. Show how the law of the action of one magnetic pole on another may be investigated by the method of oscillations.

9. State the principle and construction of the *sine* galvanometer, and of the *tangent* galvanometer.

10. Draw a rough map of isoclinical lines of Ireland, and show how the declination may be found for any place, and at any time, not very distant from the present epoch.

ACOUSTICS.

DR. HAUGHTON.

11. Two organ pipes are nearly in unison and are sounded together; describe the phenomena observed, and show how to find the note of one pipe, if that of the other be known.

12. Define accurately the "pitch," "loudness," and "kind" of sounds; give the French equivalents used by Pouillet for these expressions; and state from what physical causes they each arise.

13. Write down the notes of the octave whose lowest sound is 1000 vibrations per minute.

14. State the usual limits of the male and female human voice.

15. Give some account of the structure of the human ear.

 Classics.

ÆSCHYLUS.

MR. MAHAFFY.

Translate the following passages into English :—

1. *Beginning*, ΗΜ. Α. διανταίαν λέγεις [πλαγάν.], κ. τ. λ.
Ending, τοῖνδε δεῖν ἀνάκτοι.

Sept. contra Thebas, 894—921.

2. α. *Beginning*, Ζῆνα δὲ τις προφρόνως ἐπινίκια κλάζων, κ. τ. λ.
Ending, σέλμα σεμνὸν ἡμίνων.

Agamemnon, 174—182.

- b. *Beginning*, XO. οὐπω ξυνῆκα· νῦν γὰρ ἐξ αἰνιγμάτων, κ. τ. λ.
Ending, ταχέα δ' ἄτα πέλει.

Agamemnon, 1112—1124.

- c. *Beginning*, τὴν γὰρ στέγην τήνδ' οὐποτ' ἐκλείπει χορὸς, κ. τ. λ.
Ending, λόγῳ παλαιὰς τῶνδ' ἀμαρτίας δόμων.

Ibid., 1186—1197.

3. a. *Beginning*, τί σοι δοκεῖ; μύραινά γ' εἴτ' ἔχιδν' ἔφν, κ. τ. λ.
Ending, πολλοὺς ἀναιρῶν, πολλὰ θερμαῖνοι φρενί.

Choeph., 992—1002.

- b. *Beginning*, XO. χαίρετε, χαίρετε δ' αὐθ', ἐπιδιπλοῖζω, κ. τ. λ.
Ending, τὸ λοιπὸν εὐάνδροισι συμφοραῖς πρέπευ.

Supplices, 1014—1031.

1. Discuss the position and value of the Chorus in Greek Tragedy.
2. Give Aristotle's Definition of Tragedy, and explain it fully.
3. Describe the argument and scope of the Persæ. What were the other plays of the Trilogy, and how are they connected with the subject?

4. Mr. Blakesley has suggested several difficulties in the current version of the history of the Persian wars?

5. What were Aristophanes' criticisms on Æschylus?

6. Give an account of the extant Trilogy, mentioning the most remarkable passages in connexion with their context.

7. Æschylus and Thucydides agree as to the nature of the ancient sovereignties of Greece? Quote the passages in point from both.

MR. LONGFIELD.

Translate the following passages:—

1. *Beginning*, Jam nunc minaci murmure cornuum.....

Ending, Hesperiae sonitum ruinæ?

HORACE, *Carin.* II. i. 17—32.

2. *Beginning*, Contrane lucrum nil valere candidum.....

Ending, Desinet imparibus certare summotus pudor.

HORACE, *Epodon* XI. 11—18.

3. *Beginning*, Hæc fuerint olim. Sed tu jam mitis, Apollo,.....

Ending, Vineta, coronatus stabit et ante calix.

TIBULLUS, II. v. 79—98.

4. *Beginning*, Callimachi manes, et Coi sacra Philetæ,.....

Ending, Majus ab exsequiis nomen in ora venit.

PROPERTIUS, III. i. 1—24.

5. *Beginning*, Est fuga dicta mihi, non est fuga dicta libellis,
Ending, Fons infecundus parvaque vena fuit.

OVID, *Tristia*, III. xiv. 9-34.

1. The age of Nævius marks a signal epoch in the history of Roman literature?
2. Whence did it arise that Roman poetry was of Italian rather than Roman origin?
3. What does Mr. Sellar consider to be the characteristic excellence of Catullus? To what English poets has Catullus been compared?
4. How does Mr. Merivale interpret the religious sentiment which appears in the works of Horace?
5. In what respect is Propertius pre-eminent among the Roman elegiac poets?
6. What data do we possess for calculating the population of the city of Rome in the time of the Empire?
7. Mention the chief heads of the imperial revenue and expenditure.
8. Dion Cassius says, in reference to the powers of the Roman Emperors, λέλυνται γὰρ δὴ τῶν νόμων, ὡς αὐτὰ τὰ Λατινικὰ ῥήματα λέγει· τοῦτ' ἐστίν, ἐλεύθεροι ἀπὸ πάσης ἀναγκαίας νομίσεως εἶσι. Point out the misconception on which this statement is founded.
9. Mention some remarkable instances of Greek constructions occurring in the Odes of Horace.
10. Write a note on the structure of the Alcaic stanza.

MR. POOLE.

Translate the following passage into Greek Prose:—

Sequitur tertia vituperatio senectutis quod eam carere dicunt voluptatibus. O præclarum munus ætatis, si quidem id aufert nobis quod est in adolescentia vitiosissimum! Accipite enim, optimi adolescentes, veterem orationem Archytæ Tarentini, magni in primis et præclari viri, quæ mihi tradita est quum essem adolescens Tarenti cum Q. Maximo: "Nullam capitaliorem pestem quam corporis voluptatem hominibus dicebat a natura datam, cujus voluptatis avidæ libidines temere et effrenate ad potitundum incitarentur. Hinc patriæ proditioes, hinc rerum publicarum eversiones, hinc cum hostibus clandestina colloquia nasci; nullum denique scelus, nullum malum facinus esse, ad quod suscipiendum non libido voluptatis impelleret. Quumque homini sive natura sive quis Deus nihil mente præstabilius dedisset, huic divino muneri ac dono nihil esse tam inimicum quam voluptatem. Nec enim libidine dominante temperantiæ locum esse, neque omnino in voluptatis regno virtutem posse consistere." Quorsus hæc? Ut intelligatis, si voluptatem aspernari ratione et sapientia non possemus, magnam habendam senectuti gratiam quæ effecerit ut id non liberet quod non oporteret. Impedit enim consilium voluptas; rationi inimica est ac mentis, ut ita dicam, præstringit oculos, nec habet ullum cum virtute commercium.—CICERO.

Translate the following passage into Greek Verse:—

I. Ber. And yet they made thee duke. *Doge.* They made me so;
I sought it not; the flattering fetters met me
Returning from my Roman embassy,
And never having hitherto refused
Toil, charge, or duty for the state, I did not,
At these late years, decline what was the highest
Of all in seeming, but of all most base,
In what we have to do and to endure:
Bear witness for me thou, my injured subject,
When I can neither right myself nor thee.

I. Ber. You shall do both, if you possess the will;
And many thousands more not less oppress'd,
Who wait but for a signal—will you give it?

Doge. You speak in riddles. *I. Ber.* Which shall soon be read
At peril of my life, if you disdain not
To lend a patient ear. *Doge.* Say on. *I. Ber.* Not thou,
Nor I alone, are injured and abused,
Contemn'd and trampled on; but the whole people
Groan with the strong conception of their wrongs.

BYRON.

Translate the following passage into Latin Prose:—

The third commander-in-chief, also, whom Rome sent to Macedonia, Quintus Marcius Philippus, already mentioned as having had a hospitable connexion with the king, was not at all equal to his far from easy task. He was ambitious and enterprising, but a bad officer. His hazardous scheme of crossing Olympus by the pass of Lapathus westward of Tempe, leaving behind one division to face the garrison of the pass, and making his way with his main force through impracticable defiles to Heracleum, was not justified by the fact of its success. Not only might a handful of resolute men have blocked up the route, in which case no retreat could be thought of; but even after the passage, when he stood with the Macedonian main force in front, wedged into a narrow plain on the sea shore, and without supplies, or the possibility of foraging for them, his position was no less desperate than when he had allowed himself to be similarly surrounded in the Ligurian defiles which thenceforth bore his name. But as accident saved him then, so the incapacity of Perseus saved him now. As if he could not comprehend the idea of defending himself against the Romans, otherwise than by the blockading of the passes, he strangely gave himself over as lost as soon as he saw the Romans on the Macedonian side of them, fled in all haste to Pydna, and ordered his ships to be burnt, and his treasures to be sunk.—MOMMSEN.

Translate the following passage into Latin Lyric Verse:—

Like April morning clouds, that pass
With varying shadow o'er the grass,
And imitate, on field and furrow,
Life's chequered scene of joy and sorrow;

Like streamlet of the mountain north,
 Now in a torrent rushing forth,
 Now winding slow its silver train,
 And almost slumbering on the plain;
 Like breezes of the autumn day,
 Whose voice inconstant dies away,
 And ever swells again as fast,
 When the ear deems its murmur past;
 Thus various, my romantic theme
 Flits, winds, or sinks, a morning dream.
 Yet pleased, our eye pursues the trace
 Of Light and Shade's inconstant race;
 Pleased, views the rivulet afar,
 Weaving its maze irregular;
 And pleased, we listen as the breeze
 Heaves its wild sigh through autumn trees.

SCOTT.

History and English Literature.

ENGLISH LITERATURE.

PROFESSOR INGRAM.

- I.—1. Give an account of the prose writings of Sir Philip Sidney.
2. Write out the substance of Johnson's critical remarks on "Paradise Lost."
3. Give a full account of "Absalom and Achitophel," and "The Medal."
4. Name, in their order, the most remarkable works of prose fiction produced in England from the beginning of the eighteenth century down to the publication of "Waverley." Write a critical account of any one of them.
5. Name and describe some of the finest lyrical pieces of Gray, Collins, Coleridge, Wordsworth, and Tennyson.

II.—1. Write notes on the following words and phrases which occur in Milton:—

- a. "War he perceiv'd, war *in procinct*."
- b. "As only in his arm the *moment* lay
Of victory."
- c. "Meanwhile *inhabit lax*, ye Powers of heaven!"
- d. "Bush with frizzled hair *implicit*."
- e. "Feather'd soon, and fledge,
They *summ'd their pens*."
- f. "In posture to *displode* their second *tire*,"

2. Write notes on the following words as used by Milton : alchemy, brinded, fatal, frore, hosting, minim, realty.

3. By what passages in ancient writers were the ideas, or the turn of expression, in the following sentences suggested?—

- a. "There is a cave . . .
Where light and darkness, in perpetual round,
Lodge and dislodge by turns . . .
Light issues forth, and at the other door
Obsequious darkness enters . . ."
 - b. "Thrice happy, if they know
Their happiness, and persevere upright."
 - c. "A creature, who, not prone
And bent as other creatures, but endued
With sanctity of reason, might erect
His stature, and upright with front serene
Govern the rest. . ."
 - d. "The chariot of Paternal Deity
Flashing thick flames, wheel within wheel undrawn,
Itself instinct with spirit, but convoy'd
By four cherubic shapes : four faces each
Had wondrous : as with stars their bodies all
And wings were set with eyes, with eyes the wheels . . ."
4. Explain all the allusions in the following passages of Pope :—
- a. "The bard whom pilfer'd pastorals renown."
 - b. "Proud as Apollo on his forked hill,
Sat full-blown Bufo, puff'd by every quill."
 - c. "What made (say Montaigne or more sage Charron !)
Otho a warrior, Cromwell a buffoon ?
A perjurd prince a leaden saint revere,
A godless regent tremble at a star ?"
 - d. "Let the two Curlls, of town and court, abuse
His father, mother, body, soul, and muse."
 - e. "Where London's column, pointing to the skies,
Like a tall bully, lifts its head and lies."
5. "Well-natured Garth inflamed with early praise . . .
The courtly Talbot, Somers, Sheffield, read,
Ev'n mitred Rochester would nod the head . . ."

Write short accounts of the several persons here named.

HISTORY.

PROFESSOR BARLOW.

1. Give some account of the reign of Charles IV. of Germany. For what circumstance is his reign principally distinguished in the constitutional history of the Empire?

2. What were the principal causes of the early contests between the House of Austria and the Swiss? and how did they terminate?
3. Give an account of the Council of Lyons, A. D. 1245.
4. Mention the leading events in Italian history which took place under Pope Alexander III.
5. What are the principal causes which have been assigned for the decline and fall of the Carlovingian Empire?
6. Relate the history of John sans Peur, Duke of Burgundy.
7. What is Hallam's estimate of the political character of Louis XI.? Give an account of the "League of the Public Weal."
8. By what means was the province of Brittany incorporated with the French Empire?
9. During the reign of Edward III. the Parliament succeeded in establishing upon a firm footing three essential principles of our government; what were these? Mention some of the proofs adduced by Hallam from Parliamentary records.
10. What is Hallam's view of the state of the English Constitution under Henry III.?

SENIOR FRESHMEN.

Mathematics.

A.

DR. SALMON.

1. Find when the base of a triangle is a minimum, being given the vertical angle, and the ratio of one side to the difference between the other and a fixed line.
2. The circle circumscribing a triangle self-conjugate with regard to an equilateral hyperbola passes through the centre of the curve?
3. In the curve $x^n + y^n = a^n$, find the length of the perpendicular from the origin on the tangent, and of the intercept made on the tangent between the axes.
4. Find an expression for the length of the radius of curvature at any point of the same curve.
5. Find the envelope of a line drawn through any point on a parabola perpendicular to the focal radius vector.
6. Calculate the value of the determinant

$$\begin{vmatrix} 1, & 3, & 1, & 7 \\ 2, & 2, & 0, & 8 \\ 4, & 5, & 3, & 5 \\ 1, & 6, & 4, & 4 \end{vmatrix}$$

MR. CONNER.

7. Find the value of $\frac{1}{\log x} - \frac{x}{\log x}$ when $x = 1$.
8. Divide a given angle θ into two parts, such that $\tan^m \phi \cdot \tan^n (\theta - \phi)$, may be a maximum.
9. Transform $x^2 + 2xy - y^2 + 8x + 4y - 8 = 0$ to the axes.
10. Find the expression for the radius of curvature of an ellipse in terms of the central radius vector, and the angle it makes with the axes.
11. Given the perpendicular of a right-angled spherical triangle, and the bisector of the base; find the cosine of the hypotenuse.
12. Determine the condition that one root of a cubic equation shall be the square of another root.

MR. WILLIAMSON.

13. Given $y = e^{-x} \cos x$, prove that

$$\frac{d^4 y}{dx^4} + 4y = 0.$$

14. Show that the equation

$$\sqrt{ax + by} + \sqrt{a'x + b'y} = h$$

represents a parabola, which touches the lines $ax + by = 0$ and $a'x + b'y = 0$.

15. Ellipses are described with coincident centre and axes, and having the sum of the semiaxes constant; find their envelope.

16. Reciprocate the following theorem:—If from any point tangents be drawn to a series of concentric circles, the locus of their points of contact is a circle, which passes through the fixed point and the common centre.

17. Expand the determinant—

$$\begin{vmatrix} 0 & a & \beta & \gamma \\ a & 0 & z & y \\ \beta - z & 0 & x & \\ -\gamma & y & x & 0 \end{vmatrix}$$

and prove that the result is a perfect square.

11. Develope $\sin^{-1} x$ by Maclaurin's theorem.

B.

DR. SALMON.

1. Establish the six equations of equilibrium of a rigid body.
2. Deduce these equations from the principle of virtual velocities.
3. Investigate the position of equilibrium of a uniform beam, one end of which rests against a vertical plane, and the other on the interior surface of a given hemisphere.

4. A body of given weight is placed at any point on a parabola whose axis is vertical; find the magnitude of the force directed to the focus which will keep it in equilibrio.

5. (a). If from a circle be cut out the circle described on any radius as diameter, find the centre of gravity of the remaining figure.

(b). Or if from any sphere be removed the sphere described on the radius as diameter.

MR. CONNER.

6. A weight is sustained on an inclined plane by a second weight by means of a rope passing over a fixed pulley; find the position of equilibrium, and the pressure on the plane.

7. A rectangular beam rests on a rough inclined plane; if the inclination of the plane be increased, find whether the beam will first slide or fall over.

8. A gate is supported by a hinge at its upper end, and turns on a bolt in a socket at its lower end; find the magnitude and direction of the pressure on the latter.

9. If the beam of a false balance be uniform, find the true weight of a body in terms of its apparent weights when the weight of the arms is taken into account.

10. Find the equations of equilibrium of a body constrained to move on a given plane curve.

MR. WILLIAMSON.

11. Investigate the condition that any number of forces acting on an invariable system shall have a single resultant.

12. Prove that the horizontal component of the tension in the catenary is constant, and investigate its equation when the density is uniform.

13. A triangle ABC rests with one angle B against a smooth wall, while its vertex A is attached to a point in the wall by a string whose length is equal to AB ; show that in the position of equilibrium the distances of A and C from the wall are in the proportion of 1 to 5.

14. A beam 15 feet long balances about a point at one-third of its distance from one end; but when a weight of 10 lbs. is suspended from the other end, the fulcrum must be moved 1 foot to maintain equilibrium; find the weight of the beam.

15. A ladder 26 feet long rests against a smooth wall, its foot being 10 feet from the bottom of the wall; find the pressure and least coefficient of friction to prevent slipping on the ground,—weight of ladder being 104 lbs., and centre of gravity 6 feet from the lower end.

C.

DR. SALMON.

1. (a). Find the angle which the radius vector makes with the tangent at any point to the curve whose equation in polar co-ordinates is

$$\rho^m = a^m \cos m\omega.$$

(b). Find the radius of curvature at the same point.

2. Write down the equation of the polar reciprocal with respect to the origin of the envelope of a line drawn at any point on the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1,$$

perpendicular to the radius vector to the origin.

3. Find the locus of the intersection of normals to a conic at the extremities of a chord which passes through a given point.

4. Transform the equation $x^2 - px + q = 0$ to the form $y^2 - Py + Q = 0$ by the substitution $y = x^2 - p'x + q'$; and find the value of $P^2 - 4Q$ in terms of p, q, p', q' .

5. If u be a homogeneous function of x, y, z of the n^{th} degree, and u_1, u_2, u_3 denote its differential coefficients with regard to x, y, z , respectively, while u_{11}, u_{12} , &c., in like manner denote second differential coefficients; show that the determinant is divisible by u , and write the quotient in its expanded form

$$\begin{vmatrix} u_{11} & u_{12} & u_{13} & u_1 \\ u_{21} & u_{22} & u_{23} & u_2 \\ u_{31} & u_{32} & u_{33} & u_3 \\ u_1 & u_2 & u_3 & 0 \end{vmatrix}$$

MR. CONNER.

6. Find the expression for the radius of curvature in the curve,

$$p = \frac{mr}{(m^2 + r^2)^{\frac{1}{2}}}.$$

p being the perpendicular on the tangent,

7. Find the equation of the asymptotes of the curve whose equation is

$$x^4 - y^4 + 2axy^2 = 0.$$

8. Find the envelope of the base of a triangle inscribed in a conic, and whose sides pass each through a given point.

9. Construct a parabola geometrically which shall touch two given lines, and pass through two given points.

10. Find the equation of the evolute of the curve $y^2 = p^2 x$.

MR. WILLIAMSON.

11. If ω be a cube root of unity, and $(1 + \omega)^n$ be written in the form $s_0 + s_1 \omega + s_2 \omega^2$, prove that

$$s_1 - s_0 = \frac{\sin \frac{(n-1)\pi}{3}}{\sin \frac{\pi}{3}} \quad \text{and} \quad s_0 - s_2 = \frac{\sin (n+1)\frac{\pi}{3}}{\sin \frac{\pi}{3}}.$$

12. If $a_1 x^3 + 3a_2 x^2 y + 3a_3 x y^2 + a_4 y^3 = c_1 (x + a_1 y)^3 + c_2 (x + a_2 y)^3$, prove that a_1 and a_2 are the roots of the quadratic

$$\begin{vmatrix} 1, & x, & x^2 \\ a_1, & a_2, & a_3 \\ a_2, & a_3, & a_4 \end{vmatrix} = 0.$$

13. Determine the value of

$$\left[\frac{a_1 x + a_2 x^2 + \dots + a_n x^n}{n} \right]_x^0 \text{ when } x = 0.$$

14. Find the value of k when the equation

$$(ax + by + cz)^2 + k(x^2 + y^2 + z^2) = 0$$

represents two right lines.

15. Find the condition that the line $\lambda\alpha + \mu\beta + \nu\gamma$ should be cut harmonically by two conics, and prove that its envelope is a conic.

Classics.

HOMER.

MR. POOLE.

Translate the following passages into English Prose:—

- Beginning*, "Ὡς ἄρα φωνήσαντε παρέξ ὁδοῦ ἐν νεκύεσσιν, κ. τ. λ.
Ending, Δαοῦ ἀποτμήξαντε διώκετον ἐμμενέες αἰεῖ.
Iliad, lib. x. 349-364.
- Beginning*, Αἴας δ' οὐκίτ' ἔμιμνε· βιάζετο γὰρ βελέεσσιν· κ. τ. λ.
Ending, Τῷ ἐν χερσὶ φόως, οὐ μιλίχρη πολέμοιο."
Ibid., lib. xv. 727-742.
- Beginning*, Πηλεΐδης δ' ἀπόρουσεν ὅσον τ' ἐπὶ δονρὸς ἐρωή, κ. τ. λ.
Ending, Καὶ λαιψήρὸν ἰόντα· θεοὶ δέ τε φέρτεροι ἀνδρῶν.
Ibid., lib. xxi. 251-265.
- Beginning*, Αὐτὰρ ἐπὴν πόλιος ἐπιβείομεν, ἦν περὶ πύργος, κ. τ. λ.
Ending, Μωμεύη· μάλα δ' εἰσὶν ὑπερφίαλοι κατὰ δῆμον.
Odyssey, lib. vi. 262-274.
- Beginning*, "Ἐνθα δὲ πῦρ κήαντες ἰθύσαμεν ἠδὲ καὶ αὐτοὶ, κ. τ. λ.
Ending, "Ἡμισυ δ' αὐτ' ἴστησεν ἐν ἄγγεσιν, ὅφρα οἱ εἴη.
Ibid., lib. ix. 231-249.

1. Grote notices the different interpretations given to different classes of legends; and points out the reasons for the introduction of Dæmons as distinguished from the Gods?

2. The various senses of the word *μῦθος* illustrate the character of the ages in which they prevailed according to Grote? How does he interpret the introduction of the *Μοῖραι* in Homer?

3. What is his inference from the existence of a total blank in Grecian records immediately before the first Olympiad?

4. What is Grote's view as to the original unity of the *Odyssey*? and how does he answer the arguments of those opposed to him?

5. Mure points out the propositions which must be asserted in order to support the theory of the *Iliad* having been the joint production of many poets?

6. He notices various reasons which induce him to refer Homer to the *Æolic* rather than to the *Ionic* race?

7. Give some account of the allusions in Homer to musical and poetical compositions previously existing; quoting passages descriptive of their mode of performance.

8. Trace the circumstances which tended to weaken Athens and Sparta prior to the peace of Nicias.

9. Give some account of the career of Timoleon.

10. Notice the different precautions adopted at Athens and at Sparta for preserving the established constitution, and the reasons for them.

11. Quote a passage from Virgil parallel to No. III.

12. What is Buttman's view of the origin and meaning of the words *τηλύγετος*, *ἀμέγαρος*, *δαίφρων*, *λελημένος*?

13. *a.* What are the effects produced on the accents of words by *elision* and *crasis*?

b. What is the exact force of the case termination ϕ ? Show that a similar form appears in Latin.

c. State accurately the force of each form of *apodosis* following a *protasis* in which $\epsilon\iota$ occurs with the *indicative*.

VIRGIL.

MR. MAHAFFY.

Translate the following passages into English:—

1. *Beginning*, D. Vis ergo, inter nos, quid possit uterque, vicissim.....
Ending, Si ad vitulam spectas, nihil est, quod pocula laudes.

Eclogues, iii. 28-48.

2. *Beginning*, Quos rami fructus, quos ipsa volentia rura.....
Ending, Mitis in apricis coquitur vindemia saxis.

Georgics, lib. ii. 500-522.

3. *Beginning*, Illi ardua cervix.....

Ending, Tellurem et solido graviter sonat ungula cornu.

Ibid., lib. iii. 79-88.

4. *Beginning*, Ter circum adstantem lævos equitavit in orbes.....

Ending, Implicat, ejectoque incumbit cernuus armo.

Æneid, lib. x. 883-892.

5. *Beginning*, Quæ simul ac venis hausit sitientibus ignem.....

Ending, Nullus in ore rubor, ubi enim rubor, obstat amori.

Ciris, 163-180.

1. Discuss the origin of the legends asserting Trojans to have colonized Italy.
2. What traces of Hellenic influence are to be found in Latin civilization up to the Servian constitution?
3. Give a general account of the object and scope of the Servian constitution.
4. Write a sketch of the maritime relations among the Italian and other adjoining races in the sixth century B. C.
5. Describe the *social* state of Italy in Virgil's time.
6. Discuss the inaccuracies of Virgil as compared to Homer.
7. Discuss the merits and defects of Virgil's Eclogues, and mention some of the passages copied from Theocritus.
8. To what previous poets was he chiefly indebted, and in what respects?
9. Discuss the influence of Virgil upon the Epic poets who succeeded him in ancient and modern times.

MR. LONGFIELD.

Translate the following passage into Latin Prose :—

Theodosius, who was acquainted with the merit and power of his new ally, condescended to meet him at the distance of several miles from Constantinople, and entertained him in the imperial city, with the confidence of a friend and the magnificence of a monarch. "The barbarian prince observed, with curious attention, the variety of objects which attracted his notice, and at last broke out into a sincere and passionate exclamation of wonder. I now behold (said he) what I never could believe, the glories of this stupendous capital ! and as he cast his eyes around, he viewed, and he admired, the commanding situation of the city, the strength and beauty of the walls and public edifices, the capacious harbour crowded with innumerable vessels, the perpetual concourse of distant nations, and the arms and discipline of the troops. Indeed (continued Athanasius), the emperor of the Romans is a god upon earth ; and the presumptuous man who dares to lift his hand against him is guilty of his own blood." The Gothic king did not long enjoy this splendid and honourable reception ; and, as temperance was not the virtue of his nation, it may justly be suspected, that his mortal disease was contracted amidst the pleasures of the imperial banquets. But the policy of Theodosius derived more solid benefit from the death, than he could have expected from the most faithful services, of his ally.—GIBBON.

Translate the following passage into Latin Verse :—

"And now the storm-blast came, and he
Was tyrannous and strong :
He struck with his o'ertaking wings,
And chased us south along.

"With sloping masts and dipping prow,
As who pursued with yell and blow
Still treads the shadow of his foe,
And forward bends his head,
The ship drove fast, loud roared the blast,
And southward aye we fled.

"And now there came both mist and snow,
And it grew wondrous cold:
And ice, mast-high, came floating by,
As green as emerald.

"And through the drifts the snowy clifts
Did send a dismal sheen:
Nor shapes of men, nor beasts we ken—
The ice was all between.

"The ice was here, the ice was there,
The ice was all around:
It cracked and growled, and roared and howled,
Like noises in a swound!"

COLERIDGE, *Ancient Mariner*.

Translate the following passage into Greek Prose:—

Men are apt to think that the guilt of a lie, and consequently the punishment, may be very much diminished, if not wholly worn out, by the multitudes of those who partake in it. Though the weight of a falsehood would be too heavy for one to bear, it grows light in their imaginations when it is shared among many. But in this case a man very much deceives himself; guilt, when it spreads through numbers, is not so properly divided as multiplied. Every one is criminal in proportion to the offence which he commits, not to the number of those who are his companions in it. Both the crime and the penalty lie as heavily upon every individual of an offending multitude, as they would upon any single person, had none shared with him in the offence. In a word, the division of guilt is like to that of matter: though it may be separated into infinite portions, every portion shall have the whole essence of matter in it, and consist of as many parts as the whole did before it was divided.—
SPECTATOR.

Translate the following passage into Greek Tragic Trimeters:—

Why ask I that? my mangled body shows,
My blood, my want of strength, my sick heart shows,
That I must yield my body to the earth,
And by my fall, the conquest to my foe.
Thus yields the cedar to the axe's edge,
Whose arms gave shelter to the princely eagle;
Under whose shade the ramping lion slept;
Whose top branch overpeer'd Jove's spreading tree,
And kept low shrubs from winter's powerful wind.

These eyes, that now are dimm'd with death's black veil,
 Have been as piercing as the mid-day sun
 To search the secret treasons of the world :
 The wrinkles in my brows, now fill'd with blood,
 Were liken'd oft to kingly sepulchres ;
 For who liv'd king but I could dig his grave ?
 And who durst smile when Warwick bent his brow ?

SHAKSPERE.

Logics.

DR. MALET.

1. State fully how Locke derives the idea of Eternity from both sensation and reflection.
2. What does Locke mean by modes of Pleasure and Pain ? and what is his object in the chapters on them ?
3. What is his opinion as to our knowledge of an External World ? and state his arguments.
4. On what different grounds are the names of Mixed Modes and Substances liable to imperfection ?
5. How does he compare our knowledge of Body and Spirit ? What is his definition of Spirit ? and hence how does he determine the question of the Immateriality of the Soul ?
6. How, according to Cousin, do we arrive at the knowledge of an External World ?
7. What is Cousin's criticism on Locke's chapter on Moral Relations ?
8. How far does he agree or disagree with Locke regarding General Ideas ?
9. How, from Locke's theory of the Representative Idea, is he driven to Materialism ?
10. Cousin also charges him with a tendency to Fatalism ; how ?

 DR. WEBB.

1. How are the Laws of Thought to be psychologically distinguished from the other elements of the thinking process ?
2. Give Mansel's statement of the Laws of Homogeneity and Specification, and show how it differs from that of Kant. A third Law joined by some philosophers with these Mansel regards as questionable ?
3. The word Division is employed in different senses, and denotes different logical processes ; give an account of them ?
4. Show the futility of the various attempts which have been made to reduce Immediate Consequences to the Mediate form.

5. The several processes of Conversion may be reduced to one? This cannot properly be regarded as a process of Judgment?

6. On what grounds does Mansel assert that Logic can admit one kind of Definition, and one only?

7. Ontology, or Metaphysics Proper, may be treated in two different methods?

8. Give Sir William Hamilton's analysis of the Causal Judgment.

9. How does Whately determine the question, "Whether it is by a process of Reasoning that New Truths are brought to light?"

10. State Whately's distinction between Inference and Proof.

MR. ABBOTT.

1. Explain briefly the fundamental doctrines of Hobbes.

2. Give some account of the Optimism of Leibnitz, and contrast it with that of Plato.

3. State fully Hume's argument against the certainty of the Law of Causation, and Stewart's reply.

4. Discuss briefly the influence of Hume on British Philosophy.

5. Explain, according to Stewart's views, the connexion between Reasoning and the power of Generalization.

6. Discuss the influence of Imagination on the Moral Character.

JUNIOR FRESHMEN.

Mathematics.

A.

DR. SALMON.

1. Find the co-ordinates of the centre of the circle circumscribing the triangle formed by the points $(4, 1)$, $(-2, -3)$, $(1, -5)$.

2. Find the co-ordinates of the intersection of perpendiculars of the same triangle.

3. Find the equation of the tangent at any point to the circle

$$ax^2 + 2axy \cos \omega + ay^2 + 2gx + 2fy + c = 0.$$

4. Prove

$$\sin A + \sin (72^\circ + A) - \sin (72^\circ - A) = \sin (36^\circ + A) - \sin (36^\circ - A).$$

5. Find the sum of the series

$$1 + z \cos \theta + z^2 \cos 2\theta + z^3 \cos 3\theta + \&c.$$

6. Find the sum of
- n
- terms of the series

$$1^2 + 3^2 + 5^2 + 7^2 + \&c.$$

MR. W. ROBERTS.

7. If
- $x \sin \theta + y \cos \theta = \sin \theta \cos \theta$
- ,
- $x \sin^3 \theta - y \cos^3 \theta = 0$
- , it is required to find the value of
- $x^2 + y^2$
- .

8. Retaining the notation of question 7, prove that

$$(1 - x^2 - y^2)^3 = 27 x^2 y^2.$$

9. In the triangle
- ABC
- , let
- $AB = r$
- ,
- $BC = r'$
- ,
- M
- the middle point of
- AC
- , and
- $AM = a$
- ,
- $BM = d$
- , and the angle
- $AMB = \phi$
- ; show that

$$r^2 r'^2 = a^4 + d^4 - 2a^2 d^2 \cos 2\phi.$$

10. Denoting the sides of a triangle by
- a, b, c
- , and the angles by
- A, B, C
- , prove that

$$\text{Radius of circumscribing circle} = \frac{a \cos A + b \cos B + c \cos C}{\sin 2A + \sin 2B + \sin 2C}.$$

11. Reduce to its simplest value

$$\cos \theta + \cos \left(\frac{2\pi}{3} - \theta \right) + \cos \left(\frac{4\pi}{3} - \theta \right).$$

12. Let
- p, p', p''
- be the perpendiculars dropped from the centre of the circle circumscribing a triangle on the sides, and
- R
- the radius of the circle; prove that

$$R^3 - (p^2 + p'^2 + p''^2) R - 2pp'p'' = 0.$$

MR. CONNER.

13. Find the equation of the circle passing through the origin and the points
- $(2, -1)$
- $(-3, 4)$
- .

14. Find the length of the tangent drawn from the point
- $(-8, 7)$
- to the circle
- $x^2 + y^2 - 5x - 7y + 6 = 0$
- .

15. If
- $\cos(x-z) \cos y = \cos(x-y+z)$
- , prove that
- $\cot x$
- ,
- $\cot y$
- , and
- $\cot z$
- are in arithmetic progression.

16. Reduce

$$\tan^{-1} \left(\frac{x \cos \theta}{1 - x \sin \theta} \right) - \tan^{-1} \left(\frac{\frac{1}{x} \cos \theta}{1 - \frac{1}{x} \sin \theta} \right)$$

to its simplest form.

17. Transform the equation
- $x^3 + px^2 + qx + r = 0$
- into one whose roots are the cubes of the roots of the given equation.

18. Find the value of
- $\frac{a - \sqrt{ax}}{a - x}$
- when
- $x = a$
- .

B.

DR. SALMON.

1. Find the equation in rectangular co-ordinates of the curve whose equation in polar co-ordinates is

$$\rho^{\frac{1}{3}} \cos \frac{1}{3}\omega = a^{\frac{1}{3}}.$$

2. Given a circle, and a fixed diameter AB ; through A any line is drawn meeting the circle again in M , and the tangent at B in R ; find by polar co-ordinates the equation of the locus of a point P taken on AM , and such that $AP=MR$; and transform the result to rectangular co-ordinates.

3. Given a right line, a circle, and a fixed diameter; if any ordinate to that diameter meet the right line in T , the diameter in M , and if one of the points where it meets the circle be R ; find the locus of a point P on that ordinate such that $PM=RT$.

4. If α, β be the roots of the equation $x^3 - px + q$, form the equation whose roots are $\alpha^3 - p'\alpha + q'$, $\beta^3 - p'\beta + q'$.

5. Expand $\cos n\theta$ in terms of cosines of multiples of θ , n being a positive integer.

MR. W. ROBERTS.

$$\begin{aligned} 6. \text{ If } & a + y + z = 0, \\ & b + \alpha y + \beta z = 0, \\ & c + \alpha z + \beta y = 0, \end{aligned}$$

where α, β are the imaginary cube roots of unity, prove that

$$(a-b)^2(b-c)^2(c-a)^2 = -27(y^3 - z^3)^2.$$

7. Find the value of θ so that

$$\sec \theta, \sec \left(\frac{2\pi}{3} + \theta \right), \sec \left(\frac{2\pi}{3} - \theta \right)$$

may be in arithmetical progression, and calculate the common difference.

8. If the roots of the cubic equation

$$x^3 - px^2 + qx - r = 0$$

are in arithmetical progression, show that the common difference will be

$$\frac{1}{3} \sqrt{\frac{p^3 - 27r}{p}}.$$

9. Let P be any point in the base AB of a triangle ABC ; through P draw lines parallel to the sides, meeting AC in R , and BC in Q ; it is required to prove that

$$PC^2 + AP \cdot BP = AC \cdot PQ + BC \cdot PR.$$

10. On the sides of a triangle describe equilateral triangles, and draw three lines joining their vertices; let these lines be denoted by l, l', l'' , and let a, b, c be the sides, and Δ the area of the given triangle; prove that

$$l^2 + l'^2 + l''^2 = 6 \sqrt{3} \Delta + \frac{3}{2} (a^2 + b^2 + c^2).$$

t

MR. CONNER.

11. Find the condition that the intercept made on

$$x \cos \alpha + y \sin \alpha - p = 0$$

by the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ may subtend a given angle at the origin.

12. If a quadrilateral be inscribed in a circle, and circumscribed to another, prove that the area = the rectangle under the diameter of the greater circle, and a mean proportional between the perpendiculars on a diagonal from a pair of opposite angles.

13. Prove the equation which expresses a number in a series of powers of its Napierian logarithms.

14. Investigate analytically the equation of a circle touching three given circles.

15. Find the equation in trilinear co-ordinates of the circle which passes through the feet of the perpendiculars of a triangle.

Classics.

HERODOTUS.

MR. POOLE.

Translate the following passages into English prose:—

1. *Beginning*, Ταῦτα μὲν δὴ ἐκ βάθεος περιεβάλετο, κ. τ. λ.
Ending, ἐπ' ὧν τὴν διάβασιν ἐποιεῦντο οἱ Βαβυλώνιοι.

Lib. i. c. 186.

2. *Beginning*, Τῆς δὲ Σκυθικῆς γῆς ἡ Θρητική τὸ ἐς θάλασσαν πρόκειται, κ. τ. λ.
Ending, λέγω δὲ ὡς εἶναι ταῦτα σμικρὰ μέγαλοισι συμβαλέειν.

Lib. iv. c. 99.

3. *Beginning*, Ἀμείβεται Ξέρξης τοῖσδε Ἀρτάβανι, κ. τ. λ.
Ending, οὐκ ἂν κοτε εἶδες αὐτὰ ἐς τοῦτο προελθόντα.

Lib. vii. c. 50.

4. *Beginning*, Οἱ δὲ Ἕλληνες, ἐπεὶ τε σφί ἀπέδοξε μῆτ', κ. τ. λ.
Ending, δόντες τὰ χρήματα, ἐπολιορκέοντο.

Lib. viii. c. 111.

1. What earlier historian is alluded to by Herodotus? He seems, according to Müller, to have adopted a principle for the explanation of mythical stories which was afterwards widely accepted?

2. How did Herodotus view his History, according to Müller? and give some illustrations in proof of this.

3. Greek historians fail in recording what is now considered the chief subject of history? How is this accounted for?
4. Give some account of the story of Polycrates as told by Herodotus? What principle is illustrated by it? It may be briefly expressed in Herodotus' own words?
5. Rawlinson argues that the greater part of the History of Herodotus was written early in his life; his reasons for this?
6. To what does Herodotus attribute the safe retreat of Darius from Scythia?
7. Give some illustrations from Herodotus of the manner in which important political events are derived from causes connected with individuals.
8. What circumstances led to the creation of an Athenian navy; and whence was it maintained?
9. What causes placed Athens at the head of the Greeks? Describe the Confederacy of Delos.
10. What was the nature of the political changes which occurred in Greece between the Heroic age and that of Pisistratus; and their causes?
11. *a.* Compound words may be divided into *three* classes; how may these be analyzed so as to express their exact meanings?
- b.* What classes of verbs are included among those governing a *partitive genitive*?
- c.* Notice some of the principal cases in which a *neuter* verb is followed by an *accusative*.
12. Draw a map of Eastern Greece; marking on it the places where battles by land or sea took place during the Persian invasions.

 LIVY.

MR. LONGFIELD.

Translate the following passages:—

1. *Beginning*, Ceterum victoribus effuse sequentibus metu.....
Ending, tenere in locis consules voluisse.
Lib. xxii. c. 43.
2. *Beginning*, Ex ceteris navibus sagittarii funditoresque,.....
Ending, ut totis viribus terra aggredierentur.
Lib. xxiv. c. 34.
3. *Beginning*, Vix prior tumultus conticuerat.....
Ending, ac medio stagno evadere ad mœnia.
Lib. xxvi. c. 45.
4. *Beginning*, Una ad coercendos inventa haud magna.....
Ending, direpta urbe, sub corona omnes venierunt.
Lib. xxxviii. c. 29.

1. Rome and Carthage contrasted remarkably with each other in the manner in which they respectively treated their continental dependencies?
2. The iron determination of Rome was shown by her naval fortunes in the first Punic war?
3. What circumstances account for the wretched management of this war by the Romans, both in a military and in a political point of view?
4. A change in the constitution of the Roman army took place in the era of the Punic wars? From what period does Livy date the greedy and licentious spirit which marked the Roman soldiery of his time?
5. State precisely what was the Agrarian Law of Tiberius Gracchus, and narrate the circumstances connected with the passing of it? Who were the commissioners appointed to execute its provisions?
6. Give a sketch of the constitution of the Centuriate and Tribe Assemblies at the time of the Punic wars. What causes prevented collisions between these bodies?
7. With what event did the history of Livy terminate? It is probable that he did not leave his work complete?
8. Who was it that charged Livy with Patavinity? Different opinions have been held as to the meaning of the imputation?
9. Mark on a map of the coast line of Spain the positions of the chief towns on or near the coast, and the mouths of the chief rivers, giving the modern as well as the ancient names of the towns and rivers.
10. Give the derivations of the words *ingens*, *adminiculum*, *imago*, *rursus*, *tragula*, *cæmentum*, *ambiguus*, *consilium*.

MR. MAHAFFY.

Translate the following passage into Latin Prose :—

One day, when I had been hearing Antiochus lecture, as I was in the habit of doing, O Brutus, in company with Marcus Piso, in that gymnasium which is called Ptolemy's, my brother Quintus being with me, and Titus Pomponius, and Lucius Cicero, our cousin on the father's side as to relationship, but our own brother as to affection, we determined to take our afternoon's walk in the Academy, principally because at that time of day that place was free from any crowd. Accordingly, at the appointed time we all met at Piso's house, and from thence we walked half-a-dozen furlongs from the Dipylus to the Academy, beguiling the road with discourse on various subjects; and when we had arrived at the deservedly celebrated space of the Academy, we there found the solitude which we desired. Then said Piso—Shall I say that this is implanted in us by nature, or by some mistake, that when we see those places which we have heard that men who deserve to be had in recollection have much frequented, we are more moved than when we hear even of their actual deeds, or than when we read some one of their writings?—just as I am affected now. For the remembrance of Plato comes into my mind, whom we understand to have been the first person who was accustomed to dispute in this place; and whose neighbouring gardens not only recall him vividly to my recollection, but seem even to place the man himself before my eyes.—CICERO.

Translate the following passage into Latin Verse :—

When he who adores thee has left but the name
Of his fault and his sorrows behind,
O ! say wilt thou weep, when they darken the fame
Of a life that for thee was resign'd !
Yes, weep, and however my foes may condemn,
Thy tears shall efface their decree ;
For Heaven can witness, though guilty to them,
I have been but too faithful to thee.

With thee were the dreams of my earliest love ;
Every thought of my reason was thine :
In my last humble prayer to the Spirit above
Thy name shall be mingled with mine !
O ! blest are the lovers and friends who shall live
The days of thy glory to see ;
But the next dearest blessing that Heaven can give
Is the pride of thus dying for thee.

T. MOORE.

Translate the following passage into Greek Prose :—

When Gylippus thought it a favourable opportunity, he commenced the attack ; and, having closed in battle, they fought in the space between the works, where the cavalry of the Syracusans was of no use. When the Syracusans and their allies had thus been defeated, and had taken up their dead under truce, and after the Athenians had erected a trophy, Gylippus called his army together, and said, " that the fault was not theirs, but his own ; for he had deprived them of the benefit of their cavalry and dart-men by his arrangements for the battle, which he had made too far within the works : wherefore he would now lead them again to the charge. And he begged them to make up their minds to this view of the case—that they would not have the worse, as regarded forces ; and that with respect to resolution, it would be intolerable if they should not determine, Peloponnesians and Dorians as they were, to get the better of Ionians, and islanders, and a mixed rabble of men, and to drive them out of their country."—THUCYDIDES.

Translate the following passage into Greek Verse :—

Agrippina. 'Tis well, begone ! your errand is perform'd.
The message needs no comment. Tell your master
His mother shall obey him. Say you saw her
Yielding due reverence to his high command :
Alone, unguarded, and without a lictor,
As fits the daughter of Germanicus,
Say, she retired to Antium ; there to tend
Her household cares, a woman's best employment.
What if you add, how she turn'd pale and trembled :
You think, you spied a tear stand in her eye,
And would have dropp'd, but that her pride restrain'd it !

GRAY.

EXAMINATION FOR THE DEGREE OF BACHELOR OF ARTS.

Moderatorships in Mathematics and Mathematical Physics.

Examiners.

ANDREW SEARLE HART, LL. D.

JOHN H. JELLETT, M. A., Professor of Natural Philosophy.

GEORGE SALMON, D. D., Donegal Lecturer in Mathematics.

WILLIAM ROBERTS, M. A.

MICHAEL ROBERTS, M. A., Professor of Mathematics.

MATHEMATICS.

MR. M. ROBERTS.

1. Integrate the equation

$$y^3 \frac{d^2 y}{dx^2} + x \frac{dy^3}{dx^3} - y \frac{dy^2}{dx^2} = 0.$$

2. Show that the equation

$$y^3 \left(y - x \frac{dy}{dx} \right)^2 = 2 \frac{dy}{dx} \left(x \frac{dy}{dx} + y \right)$$

when differentiated reproduces the equation of question (1), and from this consideration deduce its integral.

3. Integrate the equation

$$\frac{d^2 y}{dx^2} + \frac{1}{x(1-x^2)} \frac{dy}{dx} + \frac{1}{1-y^2} \frac{dy^2}{dx^2} = 0.$$

4. Integrate the equation

$$\frac{dy}{dx} = \frac{(1-y)(x^2 + my)}{x(m-x^2)}.$$

5. Integrate the equation in partial differences

$$px^3 + q(1 - xy^2 - \frac{1}{2}xy) = x^2x^3.$$

6. Show that the equation

$$\frac{d^2 y}{dx^2} + \frac{ay^n}{x^{n+3}} = 0$$

has for a first integral

$$\left(x \frac{dy}{dx} - y \right)^2 + \frac{2a}{n+1} \left(\frac{y}{x} \right)^{n+1} = C,$$

and deduce in this manner its complete integral.

7. Apply Monge's method to integrate the equation

$$qxr - s(px + qy) + pyt = \frac{(p - q)(px + qy)}{x - y}.$$

8. Transform the triple integral $\iiint dx dy dz$ into another, where the variables are the square roots of the roots of the following equation in t :

$$\frac{x^2}{t} + \frac{y^2}{t - b^2} + \frac{z^2}{t - c^2} = 1.$$

MR. W. ROBERTS.

1. Find the equation of the curve parallel to the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$$

2. Form the differential equation of which the equation of the curve parallel to the ellipse is the integral.

3. Find the expression for the differential of an elliptic arc, employing as the variable the perpendicular from one of the foci on a tangent.

4. F, V are the foci of an ellipse of Cassini, and M the centre; if P be any point on the curve, prove that the normal at P will make with FP an angle equal to that which MP makes with VP .

5. Being given two confocal ellipses of Cassini, prove that any equilateral hyperbola concentric with them, and touching the interior, will cut the exterior under a constant angle.

6. From an external centre of a spherical conic an arc of a great circle is drawn, perpendicular to a tangent arc; find an expression for its tangent in terms of the axes of the conic, and the angle between it and the great circle of one of the axes.

7. Let the equation of a great circle on a sphere in spherical polar coordinates, ρ and ω , be transformed by making

$$\tan \frac{1}{2} \rho = \sqrt{-1} (\tan \frac{1}{2} R)^2, \quad \omega = 2\Omega;$$

prove that the resulting equation between R and Ω (the constant being altered so as to cause $\sqrt{-1}$ to disappear) will represent a spherical conic, the axes of which are connected by a particular relation.

8. If a surface is given by the system of equations,

$$x = F(u, v), \quad y = f(u, v), \quad z = \phi(u, v),$$

find the expression for the superficial area in terms of u and v .

9. Prove that the superficial area of the ellipsoid

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1,$$

and the volume of the surface

$$(x^2 + y^2 + z^2)^4 = k^2 (b^2 c^2 x^2 + a^2 c^2 y^2 + a^2 b^2 z^2),$$

depend on the same double integral.

10. Find the angle under which the surfaces represented by the equations

$$\frac{x}{a} + \frac{y^2}{ax - m^2} + \frac{z^2}{ax - n^2} = 1,$$

$$\frac{x^2}{m^2 + by} + \frac{y}{b} + \frac{z^2}{m^2 - n^2 + by} = 1,$$

cut each other at any point.

11. Being given that the roots x_1, x_2, x_3 of the cubic equation

$$x^3 - px^2 + qx - r = 0,$$

are positive and less than unity, it is required to form the equation which gives the value of y , where

$$\sin^{-1}y = \sin^{-1}\sqrt{x_1} + \sin^{-1}\sqrt{x_2} + \sin^{-1}\sqrt{x_3}.$$

12. Show that the complete integral of the differential equation

$$(x^2 - 4) \frac{d^2y}{dx^2} + x \frac{dy}{dx} - n^2y = 0,$$

is

$$y = Ax^n + Bx^{-n},$$

where z is a function of x given by the equation

$$z + \frac{1}{z} = x,$$

and A, B are arbitrary constants.

DR. SALMON.

1. Prove that a double point diminishes the number of points of inflexion of a plane curve by six, and a cusp by eight.

2. If m denote the degree of a plane curve, δ the number of its double points, κ the number of its cusps, verify that the characteristic number $\frac{1}{2}(m-1)(m-2) - \delta - \kappa$ is the same—

- (a) for a curve and its reciprocal;
(b) for a curve and its evolute.

3. Reduce to its simplest form the result of substituting in

$$\left(x \frac{d}{dx} + y \frac{d}{dy} + z \frac{d}{dz} \right)^2 U,$$

for x, y, z , respectively,

$$\beta \frac{dU}{dz} - \gamma \frac{dU}{dy}, \quad \gamma \frac{dU}{dx} - \alpha \frac{dU}{dz}, \quad \alpha \frac{dU}{dy} - \beta \frac{dU}{dx}.$$

4. In what degree does the condition that two curves should touch each other contain the coefficients of each equation?

5. If a line be given as the intersection of two planes,

$$ax + \beta y + \gamma z + \delta\omega, \quad a'x + \beta'y + \gamma'z + \delta'\omega,$$

and if we denote by A, B, C, D, E, F , the six determinants

$$(\beta\gamma'), (\gamma\alpha'), (\alpha\beta'), (\alpha\delta'), (\beta\delta'), (\gamma\delta'),$$

(a). Find what identical relation connects these six quantities.

(b). Express in terms of A, B , &c., A', B' , &c., the condition that two lines should intersect.

6. Discuss the surface represented by the equation

$$x^2 + y^2 + z^2 - yz - zx - xy + 4x - 2y - 2z + 6 = 0,$$

and reduce the equation to the simplest form.

7. If a surface of the second degree pass through seven points and touch a plane, what will be the locus of its point of contact with the plane? What will the locus be if the plane pass through two of the seven points?

8. If two quadrics, U, V , have a generator common, show that the discriminant of $\lambda U + V$, considered as a function of λ , is a perfect square?

9. How is the locus found of points on a surface at which the radii of curvature are equal and opposite?

10. Calculate the symmetric function $\Sigma a^2 (\beta - \gamma)^2$ of the roots of the equation

$$ax^n + nbx^{n-1} + \frac{1}{2}n(n-1)cx^{n-2} + \frac{1}{6}n(n-1)(n-2)dx^{n-3} + \&c. = 0.$$

11. Explain Tschirnhausen's method of removing any number of terms from an equation.

12. If the cubic $x^3 + 3px^2 + 3qx + r = 0$ be transformed by the substitution

$$y = a(x + p) + \beta(x^2 + 3px + 2q),$$

calculate the coefficients of y^2 and of y in the transformed equation.

13. Eliminate by differentiation the arbitrary functions from the equation,

$$y = x\phi(ax + by + cz) + \psi(ax + by + cz).$$

PHYSICAL ASTRONOMY.

DR. HART.

1. Assuming $m = .075$, $e = .05$, $e' = .017$, $k = .09$, $\frac{u'}{u} = .0024$,

$\frac{E}{M} = 40$; compute $\frac{P}{\mu u^2}$ to six places of decimals.

2. With the same assumptions, compute the forces acting on the Moon at right angles to P .

3. Point out the parts of these values in which the sixth decimal place will affect the third, fourth, or fifth place in the expression for the longitude.

4. Determine the principal inequalities of the Moon's longitude which are produced by the central and the tangential forces, respectively.

5. Calculate the principal term in the motion of apogee which is produced by the tangential force.

6. The expressions for $\frac{P}{h^2 u^2}$ and $\frac{T}{h^2 u^3}$ contain terms of the form

$$3Aa \cos(\theta - \theta') \text{ and } A \sin(\theta - \theta'),$$

respectively; compute the terms resulting from them in the values of u and θ .

7. Show how to express the true anomaly of an undisturbed planet in terms of the time by a series of powers of the eccentricity, and compute the coefficient of e^3 .

8. Prove that the attraction of an indefinite circular cylinder on an external point varies inversely as the distance from the axis, and find how it varies for an internal point.

9. Prove that each component of the attraction of a homogeneous ellipsoid on an internal point parallel to an axis is proportional to the corresponding co-ordinate of the point.

10. Find the direction of the attraction of an ellipsoidal shell on an external point.

PROFESSOR JELLETT.

MECHANICS.—DUHAMEL AND WALTON.

1. Define Poincot's central axis; and show that, for all points on this line, the resultant force coincides with the axis of the resultant couple.

a. Show how to determine this axis.

2. Deduce the equations of equilibrium of a flexible string from the principle of virtual velocities; and interpret the equations which are derived from the terms which are found without the sign of integration.

3. A rod AB is fixed at a given angle of inclination to the vertical; a rod CD is attached to AB by connexions at the points B, C ; a weight W being suspended from the extremity D . Determine the pressures exerted by AB upon CD , so far as they are determinate, and show without calculation that they cannot be perfectly determinate.

4. A quadrilateral composed of four rigid rods connected by hinges has its opposite angles connected by elastic strings in a state of tension; if the figure of equilibrium be circumscribable by a circle, the extensions of the strings must be the same?

5. Two equal uniform beams, which are capable of revolving in a vertical plane round a point to which their lower extremities are attached, have their upper extremities connected by a cord; if a rough heavy sphere be placed between them, determine the limits of the tension of the cord.

6. A homogeneous solid hemisphere is capable of rolling (without slipping) on a horizontal plane, and is acted on by a couple whose moment is given; determine the inclination of the base to the horizon.

7. Determine the positions of equilibrium of an isosceles triangle floating with its vertex downwards.

a. The number of positions is either three or one?

6. In the two oblique positions the base is equally inclined to the horizon, but in opposite directions?

8. If a floating body of any form be in equilibrio under the action of its own weight and the pressures of the fluid, determine the *vis viva* produced by a small displacement, and hence deduce the rule for the stability of equilibrium.

DYNAMICS.—DUHAMEL AND WALTON.

1. Deduce the integrals which give the values of the co-ordinates of the trajectory of a material point in a medium resisting with a force proportional to the square of the velocity.

a. Show that the curve has two asymptotes.

b. Determine the velocity, and show that it tends to uniformity.

2. Define Poinso's central ellipsoid, and show that the rotation of a solid body round a fixed point may be represented by supposing the ellipsoid to roll upon a fixed plane.

3. A material particle, acted on by a force F , is capable of describing a certain trajectory; the same trajectory may also be described under the influence of the forces F' , F'' , &c., severally; show that the trajectory may be described under the simultaneous action of all the forces, and determine the requisite velocity of projection.

4. Determine the nature of a curve such that a heavy particle will descend any arc commencing at a given point in the same time as the chord.

5. A carriage moves on a railroad round a curve of given radius; find the amount by which the outer rail must be elevated, so that the carriage may not be overturned.

6. A tube moveable in a horizontal plane round a fixed axis is charged with a number of balls at given intervals; if an angular velocity be communicated to the tube, determine the angular velocity when any given ball is at a given distance from the axis.

7. Deduce the equation of motion of an elastic fluid,

$$\frac{d^2\phi}{dt^2} = a^2 \left(\frac{d^2\phi}{dx^2} + \frac{d^2\phi}{dy^2} + \frac{d^2\phi}{dz^2} \right).$$

8. Give Poisson's integral of this equation for the case of a fluid of indefinite extent primitively disturbed throughout a given region, and show that it is a complete solution of the problem.

a. Integrate the equation in the case of a disturbance emanating from a single centre.

PROBLEMS.

DR. SALMON.

1. If from any point on the curve

$$\frac{1}{x^2} + \frac{1}{y^2} = \frac{1}{r^2}$$

tangents be drawn to the curve, the four points of contact lie in a right line?

2. Find the envelope of a circle whose centre moves along a fixed circle, and which touches a fixed right line.

3. Given in space four points and two right lines, how many pairs of planes can be drawn whose intersection shall meet the two lines, and which shall pass each through two of the given points?

4. If an equation $\phi(x) = 0$ be transformed by the substitution $y = \psi(x)$, show that any invariant of $\phi(x)$ will be a factor in the corresponding invariant of the transformed equation in y .

If the equation $ax^3 + 2bx + c = 0$ be transformed by the substitution $y = Ax^3 + 2Bx + C$, calculate the discriminant of the transformed equation.

MR. W. ROBERTS.

5. Being given a spherical ellipse, the minor axis of which is $\frac{\pi}{2}$, let two chords, arcs of great circles, be drawn through one of the foci, intersecting at right angles; it is required to prove that the sum of the chords is π .

6. A system of successive pedals is derived from a curve given by an equation in r and ω , polar co-ordinates; let n denote the order of the pedal, positive or negative, and σ its arc; it is required to prove that

$$d\sigma = \frac{nr \frac{d^2\omega}{dr^2} + (n+1) \frac{d\omega}{dr} + r^2 \frac{d\omega^3}{dr^3}}{\left(1 + r^2 \frac{d\omega^2}{dr^2}\right)^{\frac{n+1}{2}}} \left(\frac{rd\omega}{dr}\right)^{n-1} r dr.$$

7. Several equilateral hyperboloids of revolution of two sheets touch the ellipsoid

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1,$$

and are concentric with it; prove that the surface which is the locus of their vertices is given by the equation

$$\frac{2x^2}{x^2 + y^2 + z^2 + a^2} + \frac{2y^2}{x^2 + y^2 + z^2 + b^2} + \frac{2z^2}{x^2 + y^2 + z^2 + c^2} = 1.$$

8. An ellipsoid and hyperboloid are given, having the same centre, and axes coincident in magnitude and direction; prove that the pedal surfaces derived from them (the centre being the origin) are *equivalent* surfaces: that is to say, any cone described with the centre as vertex, and cutting them in closed curves, will determine portions of equal area on the two surfaces.

MR. M. ROBERTS.

9. Prove that by differentiating the equation

$$y^3 \left(x \frac{dy}{dx} - y\right)^2 = 2 \frac{dy}{dx} \left(x \frac{dy}{dx} + y\right)$$

we are led to a singular solution.

10. Deduce a complete primitive of the partial differential equation of the first order $q^2 y^2 - p^2 x^2 = 4y^2$, which expresses an algebraic relation between x, y, z .

11. Integrate the equation

$$\frac{d^2y}{dx^2} + 4 \frac{e^{2x} + e^{-2x}}{e^{2x} - e^{-2x}} \frac{dy}{dx} + 4y = 0,$$

and hence integrate the equation

$$\frac{d^2y}{dx^2} - 4 \frac{e^{2x} + e^{-2x}}{e^{2x} - e^{-2x}} \frac{dy}{dx} + 4y = 0.$$

12. Integrate the partial differential equation

$$\frac{\rho(\rho^2 - b^2)(\rho^2 - c^2)}{(\rho^2 - \mu^2)(\rho^2 - \nu^2)} - \frac{\mu(\mu^2 - b^2)(c^2 - \mu^2)}{(\rho^2 - \mu^2)(\mu^2 - \nu^2)} \frac{d\rho}{d\mu} - \frac{\nu(b^2 - \nu^2)(c^2 - \nu^2)}{(\rho^2 - \nu^2)(\mu^2 - \nu^2)} \frac{d\rho}{d\nu} = 0,$$

and express the result in terms of x, y, z , when ρ^2, μ^2, ν^2 are the roots of the following equation in t :

$$\frac{x^2}{t} + \frac{y^2}{t - b^2} + \frac{z^2}{t - c^2} = 1.$$

PROFESSOR JELLETT.

1. A string coiled round a fixed horizontal cylinder sustains a weight which hangs freely.

a. If the weight receive a given horizontal impulse in a direction perpendicular to the axis of the cylinder, so as to cause the string to coil up, find the velocity at any point.

b. If the impulse be just sufficient to carry the weight once round without allowing the string to slacken, show that the tension will attain a maximum value in the course of the first semi-revolution.

c. If the string do not slacken in the first semi-revolution, it will never slacken?

2. A groove is made in a smooth vertical board which is placed on a smooth horizontal plane; a material particle is projected down the groove; if the motion of the board on the horizontal plane be uniform, the groove will be a parabola?

3. A cylinder is laid on a rough inclined plane, the axis of the cylinder being parallel to the horizontal trace of the plane, and is kept in equilibrium by a plank laid on the cylinder, and attached by a hinge to the plane; if the inclination of the plane be gradually increased till equilibrium be broken, show that slipping will take place at the contact of the cylinder with the plank before it can take place at the contact of the cylinder with the plane.

4. In the case of a locomotive on an ordinary railroad—

a. Show that nothing is gained by additional steam-pressure after the driving wheel has begun to slip.

b. Hence determine the greatest force of steam which can be used advantageously on a given incline.

c. Two points A, B are connected by a line whose inclination is too great to be traversed by a locomotive starting from rest; is it possible to cause the locomotive to traverse the mixed line $AC + CB$, AC being horizontal?

Moderatorships in Classics.

Examiners.

CHARLES GRAVES, D. D.
 THOMAS STACK, M. A., Regius Professor of Greek.
 GEORGE LONGFIELD, B. D.
 JOHN K. INGRAM, LL. D., Professor of English Literature.

MR. STACK.

Translate the following passages accurately into English :—

1. *Beginning*, Καὶ τοῖς γιγνωσκομένοις τοῖνυν μὴ μόνον, κ. τ. λ.
Ending, αὐτοῖς εἶδеси δι' αὐτῶν τὴν μέθοδον ποιουμένη.
PLATO, *Repub.*, lib. vi. 19, 20.
2. *Beginning*, 'Εν ἀπάσαις ταῖς τέχναις καὶ ταῖς ἐπιστήμαις, κ. τ. λ.
Ending, ὀλιγαρχία μόνον ἐστίν.
ARISTOTLE, *Politic.*, lib. iv. c. 2.
3. *Beginning*, Λακεδαιμόνιοι δὲ, καθ' ἐκάστους τε, κ. τ. λ.
Ending, τοῦ μὴ φθῆναι τὴν ἑγκατάληψιν.
THUCYDIDES, lib. v. cc. 69-72.

MR. LONGFIELD.

Translate the following passages :—

1. *Beginning*, Πάρ δ' ἴθι χάλκειον θῶκον καὶ ἱπαλέα λίσσῃν, κ. τ. λ.
Ending, ἐμπίπτων, καὶ πᾶσα βοᾷ τότε νήριτος ὕλη.
HESIOD, *Opera et Dies*, 491-509.
2. *Beginning*, 'Εκ Μοισᾶν ἀγαθὸν κλέος ἔρχεται ἀνθρώποισιν, κ. τ. λ.
Ending, Ζώννυνται, ἵππεται δὲ κόρυν σκεπάουσιν ἔθειραι.
THEOCRITUS, *Idyll.* xvi. 58-81.
3. *Beginning*, Ἐχω καλά τε φράσαι, τόλμα τέ μοι, κ. τ. λ.
Ending, Θνατὸς οὐπω τις πρότερον.
PINDAR, *Olym.* xiii. 14-44.
4. *Beginning*, ΒΑΣΙΛΕΥΣ. δεῖ τοι βαθείας φροντίδος σωτηρίου, κ. τ. λ.
Ending, τάδε φράσαι δίκαια Διόθεν κράτη.
ÆSCHYLUS, *Supplices*, 405-35.
5. *Beginning*, ΗΛΕΚΤΡΑ. ἀναξ Ἀπολλων, ἵλεως αὐτοῖν κλύέ, κ. τ. λ.
Ending, κρύψας, πρὸς αὐτὸ τέρμα, κοῦκ ἔτ' ἀμμένει.
SOPHOCLES, *Electra*, 1376-97.

6. *Beginning*, ΒΑΕΛΥΚΛΕΩΝ. σκέψαι τοίνυν, ὥς, ἰξόν σοι πλουτεῖν,
καὶ τοῖσιν ἄπασιν, κ. τ. λ.
Ending, πλὴν κωλαγρέτου γάλα πινειν.
ARISTOPHANES, *Vespæ*, 698-724.

DR. GRAVES.

Translate the following passages into English :—

1. *Beginning*, *Er.* Prius edico, ne quis propter culpam capiatur suam : . . .
Ending, Mirumque adeo est, ni hunc fecere sibi Ætoli agoranomum.
PLAUTUS, *Captivi*, act. iv. sc. ii. 24-45.
2. *Beginning*, Illud in his rebus nequaquam sumere possis,
Ending, Concursare coire et dissultare vicissim.
LUCRETIVS, *De Rer. Nat.*, lib. iii. 370-395.
3. *Beginning*, Postquam inplevit opus justum versatile finem,
Ending, Ergo aliam molitur opem, sibi providus heros.
VIRGIL, *Moratum*, 39-60.
4. *Beginning*, Alma Pales, faveas pastoria sacra canenti,
Ending, Sylvicolam tepido lacte precare Palen.
OVID, *Fasti*, lib. iv. 722-746.
5. *Beginning*, Primo fige loco, quod tu discumbere jussus
Ending, Cardiacum numquam cyathum missurus amico.
JUVENAL, *Sat.* v. 12-32.
6. *Beginning*, Quin tu igitur summa nequidquam pelle decorus
Ending, Pannosam fæcem morientis sorbet aceti."
PERSIUS, *Sat.* iv. 14-32.

LATIN PROSE WRITERS.

DR. INGRAM.

Translate the following passages into English, adding such short explanatory notes as may seem necessary :—

1. *Beginning*, Avere te scribis, accipere aliquid a me litterarum ;
Ending, id perderet, et competitoribus tribueretur.
CICERO, *Epist. ad Attic.*, lib. iv. Ep. 15.
2. *Beginning*, Eodom anno, crebris populi flagitationibus,
Ending, tributumque pro illis penderent," constitutum.
TACITUS, *Annal.*, lib. xiii. cc. 50, 51.
3. *Beginning*, Aleam, quod mirere, sobrii inter seria exercent,
Ending, apud ceteros impares libertini libertatis argumentum sunt.
Ibid., *Germania*, cc. 24, 25.
4. *Beginning*, Hunc ordinem si dignitate antecellere non existimabas, . . .
Ending, sed etiam ad contumeliam improborum natum esse videatur.
CICERO, *In Verrem*, Act. II., lib. iii. c. 41.

5. *Beginning*, In censibus accipiendis tristis et aspera in omnes
Ending, per omnem vitam exercuerunt.

LIVY, lib. xxxix. c. 44

MR. STACK.

Translate the following passage into Greek Prose :—

After the heroic age considerable impulse was given to the cultivation of the military art by the conquests of the Thessalians and Dorians; among the latter of whom the art of warfare was earliest reduced to a system. The distinction of heavy and light armed foot soldiers of course took its rise with the beginnings of military service, the poorer class being unable to provide themselves with the more efficient, but more costly weapons of those who were better off than themselves. Political considerations tended to make the distinction more marked and systematic. The system of military castes was indeed unknown among the Greeks, though something answering the same purpose existed in the earliest times, when the nobles, and their immediate dependents and retainers, having greater leisure for the cultivation of skill in the use of arms, and greater means for procuring them, were separated in that respect by a wide interval from the lower class; while, conversely, military superiority was the most direct means of securing political supremacy. Hence, as soon as the distinction between the nobles and the commonalty was established, it became the object of the former to prevent the latter from placing themselves on a par with them in military strength, and so the use of the full armour of the heavy armed infantry was reserved by the former for themselves; and when in times of distress it was found necessary to entrust the demus with full armour, the result was not uncommonly a revolution. But in the democracies this distinction as regards the kinds of service depended merely upon the greater or less ability of the citizens to procure arms. In the Greek commonwealths all those who enjoyed the privileges of citizens or freemen were held bound to serve as soldiers, and were provided with arms, and trained in military exercises as a matter of course. The modern system of standing armies was foreign to Greek habits, and would have been dangerous to the liberties of the different commonwealths, though something of the kind may be seen in the body guards usually of mercenary troops kept by tyrants. The employment of mercenary troops might have led to the use of standing armies, had it not been that the use of them characterized the decline of the Grecian states, so that the circumstances which led to their employment also rendered it impossible to provide the resources for their maintenance, except when they were immediately needed. The Greek armies accordingly were national armies, resembling rather the militia than the regular armies of modern times.—RAMSAY *on the Greek Military System*.

MR. LONGFIELD.

Translate the following passage into Greek Tragic Trimeters :—

Gordon.—O that I had not lived to see this day !
 From his hand I received this dignity,

He did himself entrust this stronghold to me,
Which I am now required to make his dungeon.

We subalterns have no will of our own :
The free, the mighty man alone may listen
To the fair impulse of his human nature.

Ah ! we are but the poor tools of the law,
Obedience the sole virtue we dare aim at !

Butler.—Nay ! let it not afflict you, that your power
Is circumscribed. Much liberty, much error !
The narrow path of duty is securest.

Gordon.—And all then have deserted him, you say ?
He has built up the luck of many thousands ;
For kingly was his spirit : his full hand
Was ever open ! Many a one from dust
Hath he selected, from the very dust
Hath raised him into dignity and honour.
And yet no friend, not one friend hath he purchased,
Whose heart beats true to him in the evil hour.

COLERIDGE, *Death of Wallenstein.*

DR. INGRAM.

Translate the following passages into Latin Prose :—

I.

Where is Thræsea now ? I want to see the man of consular rank in his place ; I want to see the sacerdotal dignitary offering up vows for the emperor ; I want to see the citizen taking the oaths of fidelity. Perhaps that haughty spirit towers above the laws and the religion of our ancestors ; perhaps he means to throw off the mask, and own himself a traitor and an enemy to his country. Let him appear in this assembly ; let the patriot come ; let the leader of faction show himself ; the man who so often played the orator in this assembly, and took under his patronage the inveterate enemies of the prince. Let us hear his plan of government ; what does he wish to change ? What abuses does he mean to reform ? If he came every day with objections, the cavilling spirit of the man might tease, perplex, and embarrass us ; but now his sullen silence is worse ; it condemns everything in the gross. And why all this discontent ? A settled peace prevails in every quarter of the empire : does that afflict him ? Our armies, without the effusion of Roman blood, have been victorious : is that the cause of his disaffection ? He sickens in the midst of prosperity ; he repines at the flourishing state of his country ; he deserts the forum ; he avoids the theatre, and the temples of the city ; he threatens to abjure his country, and retire into voluntary banishment ; he acknowledges none of your laws ; your decrees are to him no better than mockery ; he owns no magistrates, and Rome to him is no longer Rome.

II.

A regular plan was formed for the new city : the streets were made wide and long ; the elevation of the houses was defined, with an open

area before the doors, and porticos to secure and adorn the front. It was also settled that the houses should no longer be contiguous, with slight party-walls to divide them ; but each was to stand detached, surrounded and insulated by its own enclosure . . . The springs of water which had been before this time intercepted by individuals for their separate use, were no longer suffered to be diverted from their channels, but were left to the care of commissioners, that the public might be properly supplied, and that, in case of fire, there might be a reservoir at hand to stop the progress of the mischief.

DR. GRAVES.

Translate the following passage into Latin Elegiacs :—

Parent of blooming flowers and gay desires,
 Youth of the tender year, delightful Spring,
 At whose approach, inspir'd with equal fires,
 The amorous Nightingale and Poet sing !

Again dost thou return, but not with thee
 Return the smiling hours I once possest ;
 Blessings thou bring'st to others, but to me
 The sad remembrance that I once was blest.

Thy faded charms, which winter snatch'd away,
 Renew'd in all their former lustre shine ;
 But, ah ! no more shall hapless I be gay,
 Or know the vernal joys that have been mine.

Though linnets sing, though flowers adorn the green,
 Though on their wings soft zephyrs fragrance bear ;
 Harsh is the music, joyless is the scene,
 The odour faint : for Delia is not there.

Cheerless and cold I feel the genial sun,
 From thee while absent I in exile rove ;
 Thy lovely presence, fairest light, alone
 Can warm my heart to gladness and to love.

LORD LYTTELTON, 1729.

Translate the following passage into Latin Alcaics :—

O mighty-mouthed Inventor of Harmonies,
 O skilled to sing of time or eternity,
 God-gifted organ-voice of England,
 Milton, a name to resound for ages—

Whose Titan angels, Gabriel, Abdiel,
 Starred from Jehovah's gorgeous armouries,
 Tower, as the deep-domed empyrean
 Rings to the roar of an angel onset.

Me rather all that bowery loneliness,
The brooks of Eden mazily murmuring,
And bloom profuse, and cedar arches
Charm, as a wanderer out in ocean,

Where some refulgent sunset of India
Streams o'er a rich ambrosial ocean-isle;
And crimson-hued the stately palm-woods
Whisper in odorous heights of even.

ALFRED TENNYSON.

HISTORY.

MR. STACK.

1. State and compare briefly the principles of association adopted in Ancient and Modern Federal Systems.
2. Compare—as bearing on the *permanence* of State-organizations—the political resources available in ancient and modern times.
3. Give an account of the political and military procedures adopted by the Romans in the conquest of Greece.
4. Write a brief account of the political system of Carthage, noting its merits and defects.
5. Write a critique on the question as to the fitness of *didactic* subjects for poetry.
6. Write a note on the difference of the Greek and the Roman conception of the *Epigram*.

Viva Voce Examination on the Political and Literary History of Rome.

DR. INGRAM.

1. Mommsen remarks that the historical vocations of the Hellenes and the Italians were prefigured in the relations of the ground which they occupied?
2. When we speak of the subjugation of Italy by the Romans, we do not place in its true light the historical fact to which we refer?
3. It is a common notion that Rome, from a very early period, marched with fixed purpose to universal sovereignty; what does Mommsen show to be the correct view of the matter?
4. Mommsen remarks that the universal empire of Rome had its ground in the political development of antiquity in general?
5. By what modern parallel does Mommsen illustrate the political position of the Barcine family at Carthage?
6. What were the fundamental principles which determined Hannibal's whole method of operations in Italy?
7. What is Mommsen's judgment with respect to the proceedings of Flaminius in Greece?

8. The origin of the Parthian Empire was due to a great national and religious reaction?
9. What were the causes of the social crisis of the time of the Gracchi?
10. What were the new features in the Agrarian Law of Tiberius Gracchus, as compared with the Licinio-Sextian?
11. What was the essential defect of the revolution of Tiberius Gracchus?
12. By what measures did Gaius Gracchus seek to divide the aristocracy?
13. What was the real nature of the Constitution of Gaius Gracchus?
14. Mommsen says, "The ancient Gallicism, and in fact the modern French character, are, in their ultimate origin, creations of Gaius Gracchus." To what does he refer?
15. In what lay the significance of the appearance of Marius as leader of the popular party?
16. What is the most probable view as to the nationality of the Cimbri defeated by Marius at Vercellæ?
17. What crucial case shows most clearly how foreign the idea of representative government was to the ancient mind?
18. On what footing was admission to the Senate placed by the legislation of Sulla?
19. How did Sulla weaken the tribunate?
20. What was the essential character of the change introduced by Sulla with respect to the regulation of the consular and prætorian functions?
21. To what analogous case does Mommsen point as indicating the real nature (apart from abuses) of the income which Rome drew from her provinces?
22. A remarkable statement of Cicero respecting general culture in the Latin towns in the middle of the seventh century is confirmed by the literature of the period?
23. The faithfulness of Julius Cæsar to Gracchan traditions is exemplified by the enterprise associated with the name "Laus Julia"?
24. The Emperor of the French observes on a sort of illusion to which students of history are liable, and under the influence of which injustice has been done to Cæsar and other great men?
25. What documents are quoted by Merivale as representing the sentiments with which intelligent public men regarded the advent of Cæsar to the supreme power?
26. Where does Ferguson conclude his history of the Roman Republic, and why?
27. How does Merivale account for the almost total silence of the Augustan poets on the merits of Julius Cæsar?
28. What is Merivale's remark on the tone of Horace's "Carmen Sæculare"?

29. Merivale remarks on the temper of the times as exhibited in the celebrated discourse of Augustus to Cinna reported by Seneca?
30. In what form was the direct taxation of the Italians revived by Augustus?
31. What is the Monumentum Ancyranum?
32. The known world in the age of Augustus was divided into three portions, distinguished from each other by their political ideas and institutions?
33. Why did the Western half of the Empire become much more closely assimilated to Rome than the Eastern?
34. What passage does Merivale quote as illustrating for us the nature of the Roman "Acta"?
35. By what modern case does Merivale illustrate the kind of service rendered by Livy to his fellow-countrymen?
36. To what influence does Merivale ascribe the unscrupulousness of Livy with respect to historical truth?
37. A remarkable class of the Odes of Horace illustrates what Merivale calls that poet's "political mission"?
38. Merivale notices a certain peculiarity in the modern names of French towns?
39. What social fact seems to be indicated by this peculiarity?
40. Mr. Congreve, in criticizing ["Roman Empire of the West"] the pacific policy said to have been enjoined by Augustus upon his successor, remarks that danger threatened the Empire from four quarters?
41. In his history of a remarkable transaction under the principate of Tiberius, Tacitus betrays the questionable sources of some of his gravest charges?
42. When was the crime of Majesty first legally specified?
43. How far was the definition of this crime extended under Tiberius?
44. What legislation of Augustus led him to recognise the practice of delation?
45. At the close of the principate of Tiberius we meet with a remarkable testimony to the benefits of the Imperial rule in the Provinces?
46. A significant change was made by Tiberius in the system of provincial government?
47. What consideration supplies the key to the public policy of the principate of Claudius?
48. Claudius may have had a special reason for the favour he showed to the Gauls?
49. What was the "Apokolokyntosis"?
50. Who was Gallio, the Proconsul of Achaia, mentioned in the Acts of the Apostles as "caring for none of these things"?
51. Merivale remarks that under the Imperial system freedom of thought was not checked in either of the two modes to which modern despotism resorts?

52. To what three sorts of teachers was the training of a Roman youth successively intrusted?

53. What Emperor was the first to institute the system of salaried professors?

54. How does Merivale account for the patience of the Romans under the tyranny of some of the Emperors?

55. The elder Pliny wrote Civil as well as Natural History; Tacitus refers to a work of his for the description of a remarkable scene of the time of Tiberius?

56. The Commonalty of Imperial Rome consisted of two broadly distinguished classes?

57. It was observed that, amidst local rebellions and central dissensions, the great bulk of the Provinces remained passive under the Roman yoke; to what explanation of this fact does Tacitus incline, and what additional considerations are suggested by Merivale?

58. Who presents the best type of the moral teachers—half philosophers, half divines and thaumaturges—of the Flavian period?

59. What is the correct general account of the policy of Domitian?

60. What book is mentioned by Merivale as giving the fullest and fairest portrait we possess of a Roman gentleman?

61. Merivale discovers a certain narrowness in the policy of Trajan?

62. Mr. Sellar remarks that three different elements combine to determine the character and colouring of Roman poetry?

63. What was the work of Livius which Horace studied under "plagiosus Orbilius"?

64. In Ennius speculative freethinking seems to have been combined with a vein of imaginative mysticism?

65. Of what Greek poets does Mommsen speak as "the oracles of cosmopolitan Hellenism"?

66. Connected with this is a remark of Mr. Sellar as to the Greek poets who had most influence on Roman literature?

67. The mature Roman Satire retained traces of its connexion with the primitive indigenous "Satura"?

68. The want of dramatic genius betrays itself in other fields of Roman literature besides tragedy and comedy?

69. On what attractions did the long-maintained popularity of tragedy at Rome principally rest?

70. What was the first important prose work in Roman literature?

Candidates were also examined vivâ voce by PROFESSOR STACK on the Political and Literary History of Greece.

PHILOLOGY AND GRAMMAR.

MR. LONGFIELD.

1. Write a short discussion on the influence on languages of the principle of dialectical regeneration.
2. Examine the objection to the theory which explains the origin of all roots by onomatopœia, "that if it were well founded, we should find among all languages a much greater identity than actually exists in the terms expressive of physical facts."
3. State distinctly the proof, derived from the Old Testament, of the antiquity of the Sanscrit literature.
4. Point out the several forms in Greek and Latin which are related to the three Sanscrit forms of the root of the interrogative *ka*, *ku*, *ki*.
5. State and illustrate the successive changes which the Latin dative plural of the first and second declensions appears to have undergone.
6. To what Greek verb is the English adjective *like* related? There is an apparent objection to connecting *like* with the Greek termination -*λικος*? What termination in Latin corresponds to this last in Greek?
7. One of the locative terminations in Sanscrit is *ām*. In the Latin, perhaps, a trace of this form is preserved?
8. Explain the terminations of the adverbs: *νύκτωρ*, *ἐμποδων*, *χαριέντως*, *βοτρυδόν*, *κομιδῇ*, *ἐμπας*.
9. As regards the reduplication in the perfect tense, show that the Latin exhibits a greater vitality than the Greek. How do you account for the aspirate in the preposition in the perfect *ἀφίσταλκα* from *ἀπόσπελλω*?
10. How does Bopp explain the terminations of the Greek passive aorists and futures? and what illustration of his view is furnished by the Latin?
11. Explain fully the termination -*ησθα* as in *ἐφησθα*. What is the termination in Latin corresponding to the -*θα*; and how as regards this termination does the Latin conform to the Sanscrit more perfectly than the Greek?
12. Point out the origin of Latin inchoative verbs in -*sco*, and explain accurately the law of their formation according as they are derived from nominal or verbal bases.
13. Write a note on the origin and meaning of the Latin supines. How is the first supine used as an auxiliary form? Can you refer to any passages where the latter supine seems to express *removal*?
14. In what class of Greek verbs almost exclusively is the second or strong perfect found? Explain the vowel changes which take place in its formation.
15. When the meaning of a verb fluctuates between transitive and intransitive, by what rule generally is the sense of the different tenses determined?
16. What tenses of the Greek verb are employed to express iteration, and with what differences of meaning?

17. Explain the use of the Greek imperfect for the present.
18. The infinitive of a verb in *-ω* terminates in *ᾶν*, not *ᾷν*; what is the reason of this?
19. There is a twofold irregularity in the accentuation of Greek nouns of the Attic declension?
20. Under what circumstances do we find both the particle *ἦ* and the genitive after comparatives?
21. Compare the usage in Greek and Latin as regards the employment of the *comparatio compendiaria*.
22. When does *οὐχ' ὅτι* mean *non solum*—when *non solum non*?
23. What rule did Dawes lay down as to the tense of the verb following *ὅπως* or *ὅπως μή*? and how far may its validity be admitted?
24. We find in old Latin writers a construction corresponding very closely to the common construction of Greek verbals in *-τεος, ἀσκητίου* *ἔστι τῆν ἀρετῆν*?
25. We may say either *consilium urbis capiendæ*, or *consilium capiendi urbem*; may the gerund with the accusative be *always* substituted for the gerundive agreeing with the noun?
26. "Nominandi istorum tibi erit magis quam edendi copia."—Various explanations have been given by critics of this kind of construction?

Moderatorships in Experimental and Natural Science.

Examiners.

HUMPHREY LLOYD, D. D., Vice-Provost.
 JAMES APJOHN, M. D., Professor of Chemistry.
 JOSEPH A. GALBRAITH, M. A., Professor of Experimental Philosophy.
 SAMUEL HAUGHTON, M. D., Professor of Geology.
 WILLIAM H. HARVEY, M. D., Professor of Botany.
 E. PERCEVAL WRIGHT, M. D., Lecturer in Zoology.

LIGHT.

DR. LLOYD.

1. Two rays of the same colour, polarized in the same plane, are compounded into a single ray; in what case will the intensity of the resulting light be equal to the sum of the intensities of the two components?
2. Prove that the intensity of light, compounded of two rays polarized at right angles, is constant, whatever be the phases of vibration in which they meet.
3. Given the amplitudes and retardations of any number of coexisting vibrations in the same plane, deduce the expression for the amplitude of the resultant vibration.

4. In Young's interference experiment, find an *exact* expression for the distance of the fringe of any order from the centre.

5. State the differences between the original theory of *thin plates* proposed by Young, and the amended theory of Poisson; and describe Fresnel's *experimentum crucis* by which the truth of the latter is established.

6. Deduce the expression for the radii of the rings produced by a *thick plate*, tarnished on its first surface.

7. Light polarized in the plane of incidence (or in the perpendicular plane) is incident on the surface of a rarer medium at an angle greater than the angle of total reflexion; prove that the amplitude of the reflected vibration may be put under the form

$$\cos 2\theta - \sqrt{-1} \sin 2\theta.$$

8. In an elliptically-polarized ray, how do you determine experimentally the direction of the axes of the ellipse, and the ratio of their lengths?

9. A polarized ray falls on a parallel plate; prove that the incident and transmitted rays can never be polarized at right angles.

10. Show that the laws of the tints exhibited by crystalline plates in polarized light are deducible from the laws of double refraction.

MR. GALBRAITH.

THEORY OF HEAT.

1. Prove that the difference of temperature of the two bulbs of a Leslie's thermometer is very nearly proportional to the elevation of one column of liquid over the other.

2. How many cubic inches of air at the standard temperature and pressure should be used for an air thermometer in order that under varying pressure and temperature

$$Vp = \text{Absolute temperature?}$$

3. A number of gases of given volumes, pressures, and temperatures, are mixed together under a given volume and temperature; investigate the pressure and density of the mixture.

4. If 50 liters of carbonic acid gas, at 100° C. and pressure 0.78^m, mixed with 10 liters of hydrogen at 10° C. and pressure 0.75^m, be contained in an inextensible vessel of 50 liters capacity; find the density and pressure of the mixture at the temperature 60° C.

$$\text{Density of carbonic acid} = 1.529.$$

$$\text{Density of hydrogen} = 0.0693.$$

5. A Fahrenheit thermometer is plunged in a hot liquid as far as the fortieth degree, the observed temperature is 150°; how much must be added to get the true temperature of the liquid, that of the air being 60°?

6. A mass of matter at such a distance from the Earth that its weight is insensible falls on its surface; calculate the number of degrees the collision would raise an equal mass of water.

7. Deduce the expression for the external work done in foot-pounds due to the evaporation at a given temperature of one pound weight of a liquid the density of whose vapour is given.

8. Compare the useful effects of a pound of water and a pound of ether raised from the ordinary temperature 50° F., and evaporated at their respective boiling points.

Specific heat of ether	= 0.5.
Boiling point of ether	= 100° F.
Latent heat of its vapour	= 164.
Density of its vapour	= 2.586.

ELECTRICITY.

1. Investigate the action of a circular current on a magnetic pole, and prove that the whole effect of the current in a direction at right angles to its plane is

$$\frac{\mu}{r} \int_0^{2\pi} \left(1 - \frac{l}{r} \cos \delta \cos \phi \right) \left(1 - 2 \frac{l}{r} \cos \delta \cos \phi + \frac{l^2}{r^2} \right)^{-\frac{3}{2}} d\phi,$$

in which μ represents the force of a unit of length of the current, r its radius, l the distance of the pole from the centre, and δ the angle which l makes with the plane of the current.

2. From this deduce the exact expression for μ in terms of the deviation of the magnet in a tangent galvanometer, rejecting all terms including powers of $\frac{l}{r}$ higher than the second,

$$\mu = \frac{rX}{2\pi} \tan \delta \left(1 + \frac{6 - 9 \cos^2 \delta}{4} \times \frac{l^2}{r^2} \right).$$

3. If l is the tenth part of r , find how much this formula differs from the simple rule of the tangent for the angular deviations 45° and 60° . For what angular deviation does the difference vanish?

4. State the theory of Volta's condenser, and give the expression for the condensing power.

5. In examining the electric condition of the surface of an insulated conductor, how did Coulomb take into account the gradual loss of the charge?

6. Explain by a diagram the nature of Groves' gas battery, and the electro-chemical reactions that take place.

7. State Faraday's law of electro-chemical decomposition.

8. If the interpolar resistance is three times a cell-resistance, what arrangement of thirty-six cells will give the strongest current?

MAGNETISM.

1. Give Biot's empirical equation for representing the distribution of magnetism in a bar as determined by Coulomb's experiments.

2. What is the precise definition of a pole? Find its position from Biot's equation.

3. Give a geometrical construction for finding the direction and magnitude of the force with which a magnet acts on a pole situated at a great distance, assuming that the force $mm' \div D^2$ is represented by D , the right line which joins the pole and the centre of the magnet.

4. From this construction deduce the following expression for the moment of the force with which one magnet disturbs another at a distance, ϕ and ϕ' being the angles between the line D and the axes of the disturbing and disturbed magnet, and a and a' their respective lengths:

$$\text{Moment } \frac{mm'aa'}{2D^3} \left[\sin(\phi + \phi') + 3 \sin(\phi' - \phi) \right].$$

5. What is the best practical method for measuring the disturbing action of a magnet on the position of another placed at a distance?

6. One magnet is placed in the meridian, and another in a given right line at right angles to the meridian; determine its position by means of the construction referred to in the third question, so that it shall exercise no disturbing action on the first magnet.

7. How are the readings of a declinometer scale corrected for torsion in order to give the real changes of declination? How is the coefficient determined in practice?

8. Describe the bifilar magnetometer, and deduce the equation which connects the horizontal component with the angle of torsion.

9. Deduce the equation which gives the relative change of X in terms of the scale readings and the temperature.

10. In what ways does a change of temperature affect the bifilar magnetometer? How is the complete coefficient for temperature determined?

PHYSICAL GEOLOGY.

DR. HAUGHTON.

1. State and prove Clairaut's Theorem, on the supposition that the Earth is composed of ellipsoidal layers, of small ellipticity, whose density varies according to any law, and without assuming the original condition of the Earth to have been fluid.

2. Deduce, from this Theorem, the figure of the Earth's surface, on the suppositions of homogeneity, and infinite density at the centre; assuming its original fluid condition.

3. Some geologists have supposed that if the Earth were originally spherical (with a mean density of $5\frac{1}{2}$, and superficial density of $2\frac{3}{4}$), it may have attained its present ellipticity ($\frac{3}{300}$), by the mere action of the sea and atmosphere upon the land. Show, by means of Clairaut's Theorem, that this supposition is inconsistent with the laws of mechanics and hydrostatics.

4. Deduce the mean density of the Earth from the following considerations:—

a. Mr. Airy's experiments on the seconds' pendulum in the Harton

coalpit showed that the pendulum gained $2\frac{1}{4}$ seconds per day at the bottom of the pit.

b. The pit was 1260 ft. deep.

c. The mean level of the land is 1000 ft.

d. The area of land to sea is as 1 : 2.815.

e. The mean density of the land is 2.75.

5. State the phenomena of Joints and Cleavage ; and show that all these phenomena, including those of Conjugate and Secondary Joints, can be simply explained on mechanical principles.

6. State the Rev. Canon Moseley's theory of glacier motion.

7. A granite is composed of—

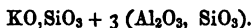
a. Pure Silica, . . . 25 parts.

b. Pure Orthose, . . . 61 „

c. Mica, . . . 14 „

100 „ ;

and the mica has the formula



Calculate the ultimate composition of the Granite.

8. A Syenite is composed of Anorthite and Hornblende, and they have the following compositions :—

	Anorthite.	Hornblende.	Syenite.
Silica,	45.87	50.72	47.52
Alumina,	34.73	9.36	28.56
Lime,	17.10	16.97	15.44
Magnesia,	1.55	2.40	1.48
Protoxide of Iron,	18.61	7.23	
	<hr/>	<hr/>	<hr/>
	99.25	98.06	100.23

Find the percentage mineralogical composition of this Syenite.

9. The Granites of Leinster contain Quartz, Orthoclase, and Margarodite ; show from the following average analyses, that they must also contain other minerals :—

	Granite.	Orthoclase.	Margarodite.
Silica,	72.07	64.59	44.58
Alumina,	14.81	18.31	32.13
Peroxide of Iron,	2.22	...	4.49
Lime,	1.63	0.25	0.78
Magnesia,	0.33	0.58	0.76
Potash,	5.11	12.23	10.67
Soda,	2.79	2.75	0.95
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	98.96	98.71	94.36

10. Assuming that in a cleaved rock what was originally a sphere has become an ellipsoid, whose semiaxes are *a*, *b*, *c* ; that the axis of *x* is the intersection of the planes of cleavage and bedding, that the axis of *z* is perpendicular to the cleavage plane, and that the axis of *y* lies in the dip of the cleavage plane ; show that the amount of compression which

has produced the cleavage may be calculated by means of the following equations :—

$$\frac{r}{b} = \sqrt{\frac{\left(\frac{\sin \phi}{\rho'} + \frac{\sin \phi'}{\rho}\right) \left(\frac{\sin \phi}{\rho'} - \frac{\sin \phi'}{\rho}\right)}{\sin(\phi + \phi') \sin(\phi - \phi')}},$$

$$\frac{r}{\rho} = \sqrt{\frac{\left(\frac{\cos \phi'}{\rho} + \frac{\cos \phi}{\rho'}\right) \left(\frac{\cos \phi'}{\rho} - \frac{\cos \phi}{\rho'}\right)}{\sin(\phi + \phi') \sin(\phi - \phi')}};$$

in which ϕ , ϕ' , are the angles between cleavage and bedding, in two localities of the same district; and $\frac{r}{\rho}$, $\frac{r}{\rho'}$, are the *distortions* of fossils in the same localities, estimated parallel to the intersection of the planes of cleavage and bedding.

DR. APJOHN.

CHEMISTRY AND MINERALOGY.

1. A soda-ash contains, in addition to carbonate of sodium, some caustic soda, sulphide of sodium, and sulphite of sodium; how may the exact amount of each of these constituents be determined?

2. Ordinary German silver consists of copper, nickel, zinc, and a little arsenic; explain the best method of making its analysis.

3. Sketch briefly how you would estimate the amount of each of the metals in a solution containing aluminum, chromium, zinc, iron, manganese, nickel, and cobalt.

4. Describe and explain Bunsen's volumetric process for estimating the value of an oxide of manganese, or of a specimen of bleaching salt.

5. What is Liebig's volumetric process for the estimation of hydrocyanic acid?

6. What process would you adopt in order to ascertain the amount of each metal in a mixed solution of lead, bismuth, silver, and mercury?

7. Should a solution include cadmium, mercury, and copper, what course would you take to effect their separation?

8. 94 measures of mixed hydrogen, marsh gas, and carbonic oxide, required for complete combustion in the voltaic eudiometer 161 measures of oxygen, and, after the explosion, the volume of residual gas was only 88; what were the respective volumes of each of the gases in the mixture?

9. A silicate includes fluorine, and phosphoric acid also; how is its analysis best effected?

10. Name the minerals occurring in the "Felspar Group" of Dana; specify the crystalline systems in which they occur, respectively; and say

to which of them you would refer a specimen having the following composition :—

Silex,	43.74
Alumina,	37.54
Lime,	13.60
Magnesia,	4.86
	<hr/>
	99.74

12. 64 grains of a metallic ore on analysis gave

Sulphur,	12.64
Antimony,	15.57
Lead,	27.44
Copper,	8.35
	<hr/>
	64.00

how was its analysis made; and what are its formula, its name, and its crystalline system?

13. Enumerate the native oxides which occur in the monometric, dimetric, and trimetric systems, respectively, and write the formula of each.

14. Rutile, anatase, and brookite, have a common composition; state what it is, and explain why they are considered as three distinct minerals?

15. There are two silicates of zinc; what is the name, the formula, and the crystalline system of each?

16. What are the electro-positive, and what the electro-negative sulphides which compose grey copper, and in what relative proportion are they found in the mineral? State also the best method of accomplishing its analysis.

17. What are the hemihedral forms which Dana describes as occurring in the second, third, and fourth systems, but of which Rose makes no mention; and what the minerals in which they are exhibited?

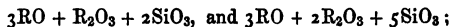
18. Describe symbolically the notation of the chief cleavage planes of orthoclase, using first the notation of Rose, then that of Dana.

19. In a crystal of sulphur as given by Dana we find the following planes, viz. :—

$$I, 1 \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, 1\bar{1}, 1\bar{1}, \frac{1}{3}\bar{1};$$

what is Rose's notation for these planes?

20. Two mineral specimens are found to have, respectively, the empirical formulæ



upon what principle may they be considered as constituting the same species; and what is the mineralogical name of such species?

ORGANIC CHEMISTRY.

1. What are the relative volumes of butylene, of the oxygen necessary to burn it, and of the products of its combustion?

2. Mention any cases with which you are acquainted in which hydrogen has been combined with an organic compound, and explain the processes by which it has been accomplished.

3. Write the formula of formic acid; explain the ordinary method of preparing it, the use to which it is applied in analysis, and Berthelot's process for making it synthetically.

4. Write the formula which represents the composition of the best gun cotton, and give the *rationale* of the process by which the cotton may be recovered from it.

5. Write the formulæ of the alcohols of which acrolein, the essential oil of almonds, and oil of cinnamon are the aldehyds, and enumerate the leading characters by which the aldehyds as a group are distinguished.

6. Explain the methods successfully employed by Berthelot for making the ethylic and methylic alcohols by artificial means.

7. Write the formula of amylic alcohol on the unitary plan, and point out how, by the method of replacement, it will yield the sodium-alcohol, the simple ether, and the acetic ether of this series.

8. If any hydrated monobasic acid has the constitution $C_n H_n' O_n$, what will be its unitary formula?

9. How is cyanide of amyl made; and what products does it yield when digested with a strong solution of potash?

10. The hydrocyanic ethers may be viewed as nitriles, and derived from ammoniacal salts; how, on this plan, would you prepare the cyanide of ethyl?

11. Carbonic ether gives different products according as it is treated with one or with two atoms of ammonia; what are they?

12. What is the product of the action of ammonia on cyanic ether; and what the substance formed when such substance is placed in contact with water?

13. Mention any instances you know of exceptions to the law of Dumas in relation to the replacement of hydrogen by chlorine.

14. How did Wurtz prepare hydrocarbons corresponding to the double ethers?

15. Give the formulæ of acetylene, and explain the process by which it may be obtained pure.

16. Write the formulæ of the different diatomic alcohols; explain the process by which that first discovered has been made; and give as many as you can of the heterologous terms of the series to which it belongs?

17. What, according to Berthelot, is the exact chemical nature of the fatty matter called stearin; and how did he prove experimentally the correctness of his views?

18. Describe the readiest mode of procuring glycerine; give its formula, viewing it as a tribasic alcohol; and explain how it may be made by a synthetic process.

19. Eleven volumes of a gaseous hydrocarbon were mixed in a eudiometer with an excess of oxygen; and after having been fired by the electric spark, the mixture was found to have undergone a diminution of bulk amounting to 27.5 volumes; when now exposed for some time to a ball of hydrate of potash slightly moistened, there was a further contraction of 33 volumes; from these data deduce the formula of the hydrocarbon, its name, and its density: the specific gravity of the vapour of carbon being 0.4146, and that of hydrogen 0.0691.

20. Ten grains of the anhydrous oxalate of an organic base burned with oxide of copper gave

Carbonic acid,	14.505 grains.
Water,	8.901 „

Fifteen grains of same salt, treated by the method of Dumas, gave of nitrogen, measured over water at the temperature of 72°, and under a pressure of 28.86 inches of quicksilver, 8.405 cubic inches; what is the name, and what the composition, of the base entering into the constitution of the salt.

N. B.—The maximum tension of vapour at 72° is 0.7841.

DR. HARVEY.

STRUCTURAL BOTANY.

1. What classes of plants consist wholly of cellular tissue?
2. In what class of plants does vascular tissue *first* make its appearance, and under what forms?
3. In what parts of phænogamous plants are spiral vessels constantly found, and what are their characters?
4. What peculiarity of internal structure causes the appearance of dots on the surface of dotted-cells?
5. In what respect does the germination of an Exogenous, differ from that of an Endogenous seed?
6. How is the absorbing surface of roots, especially in dry soils, multiplied?
7. How may the life of a biennial plant be artificially prolonged from year to year?
8. What are the principal varieties of underground stems, and how are they known from true roots?
9. Name certain plants in which the *functions* of the leaf are discharged by modifications of the stem or of its branches.
10. Weak stems support themselves in a vertical position by certain contrivances; name them.
11. What is the essential difference between the wood-bundle of an Endogen and that of an Exogen?
12. What are the usual systems of phyllotaxis in Endogens and in Exogens, respectively?

13. Describe the difference in the *arrangement* of the cells of the *upper* and *under* surfaces of a leaf.
14. What causes the natural wearing out or decay of a leaf?
15. In what positions are flower-buds found?
16. When many bracts form a more or less perfect whorl, what is that whorl called?
17. How is a *coloured* calyx distinguishable from a corolla?
18. Describe the principal varieties of aestivation.
19. How may the exceptional cases in which *stamens* are *opposite* to petals be explained?
20. What constitutes stamens *monadelphous*, *diadelphous*, *polyadelphous*, and *syngenesious*, respectively?
21. What is the ordinary structure of a pollen-grain, and how is fertilization effected?
22. What is the ordinary structure of an ovule *before* fertilization?
23. What is the distinction between *normal* and *spurious* dissepiments in pluricarpellary fruits?
24. What is the function of the *raphe* in developing seeds?
25. Name, in the order of their importance, the structural characters which assist in the determination of the natural affinities of plants.

SYSTEMATIC BOTANY (*Bentham's British Flora*).

26. How are *Ranunculaceæ* known from *Papaveraceæ*?
27. How is *Caltha* distinguished from *Ranunculus*?
28. In what British Ranunculaceous genera are the sepals persistent?
29. What is the structure of the anther in *Berberis*?
30. What are the structure and arrangement of the stamens in *Fumariaceæ*?
31. In what various positions is the radicle placed, with respect to the cotyledons, in the seeds of *Cruciferae*?
32. What does Bentham say about the production of capsules and seeds in British Violets?
33. How is a *Stellaria* known from a *Cerastium*?
34. How are the two suborders of *Caryophyllaceæ* distinguished?
35. What is the floral structure of *Linum*?
36. What is the aestivation of the *calyx*, and of the *petals*, respectively, in *Malvaceæ*?
37. What is the structure of ovary and fruit in *Geranium*?
38. What variations occur in the *number* and *cohesion* of the stamens in *Leguminosæ*?
39. How are the *Pomaceæ* known from other *Rosaceæ*?
40. What is the prevalent number or multiple in the petals and stamens of *Onagraceæ*?

41. Which of the British Saxifrages are found wild *only* in Ireland?
42. What noted *poisons*, and what *esculents*, occur among British *Umbelliferæ*?
43. How are the whorled leaves of *Galium* theoretically explained?
44. Which of the British *Ericaceæ* are found wild in Ireland, but not in England or Scotland?
45. How are the stamens inserted in *Primulaceæ*?
46. What are the distinguishing characters of *Boraginæ*?
47. Name the British genera of *Coniferæ*.
48. Which of the British *Orchidaceæ* is peculiar to Ireland, and in which of our counties does it occur?
49. How are *Juncaceæ* known from *Liliaceæ*?
50. Describe the inflorescence of a Grass.

ZOOLOGY.

DR. E. PERCEVAL WRIGHT.

1. What types of structure do we meet with among the Rhizopoda?
2. Describe the Gregarina of the common earth-worm, and give an account of its development.
3. What reasons have been assigned for not placing the Infusoria among the Protozoa?
4. Describe the Hydra fusca, and contrast it with the Actinia mesembryanthemum.
5. Describe any species of Ctenophora.
6. Give the characteristics of the genera Echinus, Clypeaster, and Spatangus.
7. In what remarkable respects do the Asteriadæ differ from the Echinidæ?
8. Enumerate the orders of Insecta, giving their chief characteristics.
9. Describe the metamorphosis of the common Locust and the white Butterfly from the egg to the perfect insect.
10. Give the classes of the Odontophora.
11. Give a few of the more remarkable genera of the Pneumonogastropoda.
12. How is respiration effected in the higher Crustacea, and how in the higher Arachnida?
13. How is respiration effected in Man, in Birds, and in any Chelonian Reptile?
14. To what families and orders do the following belong: Ampullaria, Apteryx, Armadillo, Berœ, Blindworm, Cuckoo, Comatula, Dodo, Giraffe, Lyre Bird, Proteus, Sturgeon, Turbot, Xylotrya, Virgularia?
15. Give the dental formula of the Skull on the table.

16. Give the dentition of the genus *Lepus*.
17. Refer the specimens marked A and B to their respective classes, orders, and families.
18. Give a short account of Balbiani's researches on the minute structure of the ovum.
19. Define the terms "chorda dorsalis" and "visceral arches."
20. Who discovered the circulation of the blood, and who first described the blood discs?
21. What is the difference between the process of digestion in the Mouth and in the Stomach?
22. The food having become Chyme, trace its transformation into Chyle.
23. The food having become Chyle, trace its circulation through the system.
24. In what leading respects does the brain of a Fish differ from that of a Bird?
25. With what nervous system in the Mammal is the nervous system of the Insect most comparable?

Moderatorships in History, Political Science, and English Literature.

Examiners.

JOHN TOLEKEN, M. D.

MOUNTIFORD LONGFIELD, LL. D., Professor of Feudal and English Law.

JOHN K. INGRAM, LL. D., Professor of English Literature.

GEORGE F. SHAW, LL. D.

JAMES W. BARLOW, M. A., Professor of History.

HISTORY.

PROFESSOR BARLOW.

1. Give a brief sketch of the Revolutions in the kingdom of Naples under the lines of Anjou and Aragon.
2. What causes have been assigned for the great political influence in Italy of Henry of Luxemburg? Give a short account of his Italian expedition.
3. Relate the history of the conquests of Robert and Roger Guiscard. Who were the Varangians?
4. What is Hallam's proof that the House of Stuart no more came in by a clear title to the English Crown than the House of Brunswick?

5. With respect to the claims of the Royalists and Parliamentarians for support, Mr. Hallam remarks "that there was so much in the conduct and circumstances of both parties in the year 1642 to excite disapprobation and distrust, that a wise and good man could hardly unite cordially with either of them." In support of this statement he refers to several of their proceedings?

6. On what grounds does he assert that the Treaty of Ryswick could be nothing else than a preliminary armistice of vigilance and preparation?

7. What view does he take of the general policy of Sir Robert Walpole? In what respects had the power of government been enhanced between the beginning of the eighteenth century and the period of his administration?

8. Give Mr. Hallam's historical sketch of the Law of Libel in England.

DR. TOLEKEN.

1. Compare the condition of France and Germany during the period which elapsed between the separation of the French from the German side of Charlemagne's empire and the middle of the thirteenth century. What is Mr. Hallam's opinion as to the extent of the Feudal System? State the peculiar privileges of the leading French vassals.

2. Give an account of the changes which took place in the early Judicial Polity of France. What reasons does Hallam give why the rights of Territorial Jurisdiction were less instrumental to tyranny than might be inferred from their extent?

3. Mention the chief political occurrences in the reign of Louis le Gros, and give some account of the literary controversies which arose during the same period.

4. The Papacy of John XXII. was connected with important events in the history of Germany? What was the immediate occasion of the struggle with the Empire, and how was it terminated?

5. What Popes are mentioned in connexion with the Great Schism? How was Europe divided? Describe the most important proceedings of the Council of Constance, and show how the relations in which England and France stood to each other may have influenced the result.

6. Give a summary of the early history of Hungary, as far as relates to her connexion with the House of Hapsburg, up to the accession of Matthias Corvinus.

7. What was the Pragmatic Sanction of the Emperor Charles VI.? By what treaties did France engage to accept it, and how did she endeavour to evade them? State the principal articles of the latter of these treaties.

8. Give an account of the origin and constitution of the Bank of St. George. To what English Corporation is it compared by Hallam?

LAW.

DR. LONGFIELD.

1. If in the next session an Act of Parliament should be passed not mentioning Ireland, would it extend to this country?
2. What was meant by "Poynings' Laws"? Why were they so called, and what was their general purport?
3. What are incorporeal chattels? Name some of them.
4. Can things personal be held in joint tenancy, in common, or in coparcenary?
5. How long does the title remain to property acquired by occupancy? Give an example of this doctrine.
6. What exceptions are there at Common Law to the *jus accrescendi* of personal property held jointly?
7. What are the exceptions to the rule that a husband and wife may not be witnesses against each other?
8. What interest does the husband take in the chattels real of his wife?
9. If the wife during coverture becomes entitled to any equitable personal property, on what conditions will the Court of Chancery assist the husband to recover it?
10. An attempt was made in the reign of George I. to limit the number of the Peerage; what led to that attempt, and what was the cause of its failure?
11. What is Mr. Locke's theory as to the power of the People to remove or alter the Legislature? and why cannot it be recognised by any law?
12. State the chief disabilities to which every Corporation is subject.
13. What is the supposed origin of the rule that there must be three members to make a college?
14. What are the exceptions to the rule that a sole corporation cannot take goods in his corporate capacity?
15. How far has a corporation power to make by-laws regulating its power of electing its own members and officers?
16. What three constituent parts must there be in every court?
17. To what extent is a barrister answerable for what he says in the conduct of a cause?
18. How did the Court of Exchequer first obtain its jurisdiction over ordinary suits?
19. What kind of action must still be brought in the Court of Common Pleas?
20. Explain the origin of trials at Nisi Prius, and whence they derived their name.
21. In crimes, what is the difference between a principal in the first or second degree and an accessory?

22. What are the most usual cases of contracts by record? Describe them.
23. In what cases may a party to a deed dispute the facts stated in it?
24. What is necessary to make a contract in restraint of trade valid?
25. In what cases can a contract be enforced against a person who was a lunatic when he entered into it?

POLITICAL ECONOMY.—ADAM SMITH, MILL, SENIOR.

DR. SHAW.

1. In the two chapters devoted by Mr. Mill to the discussion of the subject of peasant proprietors, he quotes evidence from Sismondi, Inglis, Kay, Howitt, Thornton, Rau, Lavergne, the Prussian Minister of Statistics, the British Consuls at Ostend and Copenhagen, the "*Journal des Economistes*," the "*Treatise on Flemish Husbandry*" (L. U. K.), Michélet, Niebuhr, and Arthur Young; specify the point or points to establish which each of these observers is quoted.

2. Three objections are ordinarily made to a system of community of property, and equal distribution of produce: namely, 1st, that each person would be incessantly occupied in evading his share of the work; 2nd, That, every member of the community being assured of a subsistence for himself and his family, all prudential restraint on the multiplication of mankind would be at an end; and, 3rd, That it would be difficult to apportion fairly the labour of the community among its members; discuss the validity of these three objections.

3. Suppose 10 yards of cloth in England cost as much labour as 15 yards of linen, and in Germany as much labour as 20 yards of linen; show,

- (a). That a trade would spring up between the two countries;
- (β). That, omitting cost of carriage, the ratio of the values of the two articles would be the same in both countries;
- (γ). That this ratio must lie between the limits $\frac{1}{2}$ and $\frac{2}{3}$, and may approach indefinitely near to either of these limits;
- (δ). That, including the cost of carriage, and supposing it, for example, to be worth one yard of linen, the ratio of the values is no longer identical in both countries, but is not necessarily $\frac{1}{2}$ in one and $\frac{2}{3}$ in the other, and state the condition which must be satisfied in order that these numbers may represent the values;

(ε). Answer the question, so far as it can be answered, which of the two countries pays the greater share of the cost of carriage? and, finally,

(ζ). Show how the theory of the international value embodied in the answers to the above questions is to be completed by introducing a greater number of commodities than one on each side; and

(η). a greater number of countries than two engaging in mutual trade.

4. Show that (a) the rate of wages depends on the ratio of capital to population, qualifying the sense in which each of these two words is used; and (β) that the truth of this law is not affected by the fact that wages are high when trade is brisk; or (γ) by the fact that wages are high

when prices are high; or (δ) by the fact, so far as it is one, that money-wages rise and fall with the price of food.

5. "The more capital a country like England expends in improving production at home, and in working fertile lands and mines abroad, the more she will have left for use at home." From what *data* is this paradox derived by Mr. Mill?

6. Write a brief notice of the co-operative system of industry, pointing out the various ways in which it affects, for good or evil, the productiveness of industry; the moral benefits or injuries that may be expected to flow from it; and the process, if there be any, by which the present accumulations of capital may pass spontaneously into the hands of co-operative associations.

1. Senior investigates the causes that regulate the rate of profit by imagining the case of a small colony of capitalists and labouring families placed in a fertile territory, paying no rent or taxes, using no money, and subject beside to the condition that all the advances are made on the first day of the year, and all the returns on the last: Reproduce, by his numerical process or otherwise, the economic results he arrives at in the two cases—(α) where the capitalists act in perfect concert; and (β) where they engage in mutual competition; adding any criticisms that may appear to you to be valid.

2. By what arguments does Senior combat the popular opinion that tithes have a greater tendency than rent to rise as society advances; and how does he account for the prevalence of the opinion?

3. Give (α) Adam Smith's explanation of his division of capital into fixed and circulating, and (β) his enumeration of the subdivisions of each. (γ) State the error into which both Ricardo and Mr. Mill fall with respect to Adam Smith's division; and (δ) Senior's correction of his enumeration, especially as regards the wages advanced to the labourer, and finished articles in a dealer's shop. (ϵ) Show that, in objecting to Adam Smith's exclusion of dwelling-houses, and other articles which the owner lets out to the consumer, Senior mistook Smith's meaning, from overlooking an important distinction laid down in the passage which he intended to quote.

4. Discuss the question whether, and how far, additions to fixed capital, when made at the expense of circulating, are injurious to the interests of the labouring classes. Notice especially the argument, that improved machinery, by cheapening the commodities produced, leads to an increased demand for them, and thus enables a greater number of labourers to find employment in the production of them.

5. Trace the effects produced on international exchanges by a tax on (α) an imported, and (β) an exported commodity.

6. It is contended by some writers, that a large portion of our present national debt was contracted during the years 1797 and 1819, when the Bank of England was exempted from giving cash for its notes, and therefore that it is unjust that tax payers should now be paying interest on the same nominal sums in a currency of full value which were borrowed in a depreciated one. Give the common answer to this plea, and

show that it involves a false admission. Give Mr. Mill's three better answers; and state whether any of them are applicable to a similar plea—should such a one be raised—against the payment of the present American national debt.

PROFESSOR INGRAM.

ENGLISH LITERATURE.

1. Write notes on the italicized words in the following extracts from Chaucer and Spenser:—

- a. "I saw his aleves *pursled* at the hond
With *gris*, and that the finest of the lond."
- b. "Like to the *estres* of the grisly place
That hight the great Temple of Mars in Thrace."
- c. "Yet saw I *Woodness* laughing in his rage."
- d. "If that I mis-speak or say,
Wite it the ale of Southwark, I you pray."
- e. "But *well unneathes* thilke word he spake."
- f. "His *herbervee*, his *mone*, and his *lodemanage*."
- g. "The beast, impatient of his smarting wound...
Thought with his winges to *stye* above the ground."
- h. "He so *disseised* of his gryping grosse,
The knight his *thrillant* spear again assay'd
In his bras-plated body to *embosse*."
- i. "And thou, faire *ymp*, sprung out of English race"...
- j. "But now *aread*, old father, why of late
Didst thou *behight* me born of English blood?"
- k. "In goodly *thewes* and godly exercise."
- l. "I *read* you rest and to your bowers *recoyle*."
- m. "And he that *harrowed* Hell with heavy *stowre*."

2. Illustrate by parallels from Shakspeare the following words and phrases from the Authorized Version of the Bible:—

- a. "Be *careful* for nothing."
- b. "That which I do, I *allow* not."
- c. "I *know* nothing *by* myself; yet am I not hereby justified."
- d. "The new moons and sabbaths, the calling of assemblies, I cannot *away with*."

3. State from which of Shakspeare's plays each of the following sentences is taken; by whom each is spoken, and to whom addressed, in the place where it occurs. Explain the construction and general sense of each passage, and the allusions it contains; and comment on such words or phrases as require notice:—

- a. "Yet better thus, and *known to be contemn'd*,
Than still contemn'd and flatter'd. To be worst,

The lowest and most dejected thing of fortune,
Stands still in esperance, lives not in fear :
 The lamentable change is from the best
The worst returns to laughter."

- b. "Such things in a false disloyal knave
 Are tricks of custom : but in a man that's just
 They're *close delations*, working from the heart,
 That *passion cannot rule*."
- c. "Being *perfected*, how to grant suits,
 How to deny them ; whom to advance, and whom
 To *trash for overtopping* . . ."
- d. "O, this life
 Is nobler than attending for a *check* ;
 Richer than doing nothing for a *bride* ;
 Prouder than rustling in unpaid-for silk ;
 Such *gains the cap* of him that makes him fine,
 Yet keeps his *book uncross'd*."
- e. "My lord, when shall we go to Cheapside, and *take up* commodities *upon our bills* ?"
- f. "If this should fail,
 And that our *drift look through* our bad performance,
 'Twere better not *assay'd* ; therefore this project
 Should have a *back or second*, that might hold,
 If this should *blast in proof*."
- g. "Thou art not honest : or
 If thou incline that way, thou art a coward ;
 Which *hoxes honesty behind*, restraining
 From course required."
- h. "He makes up the *file*
 Of all the gentry ; for the most part such
 To *whom* as great a charge as little honour
 He meant to lay upon, and his own letter
 (The honourable board of council out)
 Must *bring him in the papers*."
- i. "O place ! O form !
 How often dost thou with thy *case*, thy *habit*,
 Wrench awe from fools, and tie the wiser souls
 To thy false seeming ! *Blood, thou art blood !*
Let's write good angel on the devil's horn,
'Tis not the devil's crest."
- j. "If such a one will smile, and stroke his beard ;
 And '*sorrow way*' cry ; hem, when he should groan ;
 Patch grief with proverbs ; make misfortune *drunk*
 With *candle-wasters* ; bring him yet to me,
 And I of him will gather patience."
- k. "There is division . . . twixt Albany and Cornwall ;
 Who have (as who have not, that their great stars
 Thron'd and set high ?) servants, who *seem no less* ;
 Which are to France the spies and *speculations*

*Intelligent of our state ; what hath been seen
Either in snuffs and packings of the dukes ;
Or the hard rein which both of them have borne
Against the old kind king."*

- l. "O, then we bring forth weeds
When our *quick winds* [*al. minds*] lie still, and our faults
told us
Is as our *earing*."

4. Write explanatory notes on the italicized words in the following quotations from Shakspeare :—

- a. "To *jump* a body with a desperate physio
That's sure of death without it."
- b. "But since, so *jump* upon this bloody question,
You from the Polack wars, and you from England,
Are here arrived . . ."
- c. "We'd *jump* the life to come."
- d. "One said there were no *sallets* in the lines, to make the matter
savoury."
- e. ". . . Pick a *sallet*, which is not amiss to cool a man's stomach
this hot weather."
- f. "But for a *sallet* my brainpan had been cleft with a brown bill."
- g. "Let her be *round* with him."
- h. "We are such stuff
As dreams are made on ; and our little life
Is *rounded* with a sleep."
- i. " *Rounded* in the ear
With that same purpose-changer, that aly devil . . ."
- j. "Poor I am but his *stale*."
- k. "The trumpery in my house, go bring it hither
For *stale* to catch these thieves."
- l. "No ; this thrice worthy and right valiant lord
Must not so *stale* his palm, nobly acquired,
Nor, by my will, assubjugate his merit . . .
By going to Achilles."
- m. "He *shent* our messengers."
- n. "Bring a *corollary*
Rather than want a spirit."
- o. "O Eglamour, thou art a gentleman . . .
Valiant, wise, *remorseful*, well accomplish'd."

5. State from what writers, and from which of their works, the following passages are taken, and explain all the allusions they contain :—

- a. "Cut is the branch that might have grown full straight.
And burned is Apollo's laurel bough,
That sometime grew within this learned man."
- b. "O happy peasant ! O unhappy bard !
His the mere tinsel, her's the rich reward ;

He prais'd perhaps for ages yet to come,
 She never heard of half a mile from home ;
 He lost in errors his vain heart prefers,
 She safe in the simplicity of hers."

- c. "Love had he found in huts where poor men lie,
 His daily teachers had been woods and rills,
 The silence that is in the starry sky,
 The sleep that is among the lonely hills."
- d. "Say, for you saw us, ye immortal lights,
 How oft unwearied have we spent the nights,
 Till the Ledaean stars, so fam'd for love,
 Wonder'd at us from above !
 We spent them not in toys, in lusts, or wine,
 But search of deep philosophy,
 Wit, eloquence, and poesy,
 Arts which I lov'd, for they, my friend, were thine."
- e. "The Pilgrim of Eternity, whose fame
 Over his living head, like heaven, is bent,
 An early but enduring monument,
 Came veiling all the lightnings of his song
 In sorrow . . ."
- f. "Stately stept he east the wa',
 And stately stept he west ;
 Full seventy years he now had seen,
 With scarce seven years of rest."
- g. "That vile rout that tore the Thracian bard
 In Rhodope, where woods and rocks had ears
 To rapture, till the savage clamour drown'd
 Both harp and voice ; nor could the Muse defend
 Her son."
- h. "The great Emathian conqueror bid spare
 The house of Pindarus, when temple and tower
 Went to the ground : and the repeated air
 Of sad Electra's poet had the power
 To save the Athenian walls from ruin bare."
- i. "Let Hebron, nay, let Hell, produce a man
 So made for mischief as Ben-Jochanan . . .
 . . . as the devil owes all his imps a shame,
 He chose the apostate for his proper theme ;
 With little pains he made the picture true,
 And from reflection took the rogue he drew."
- j. "Barzillai, crown'd with honour and with years.
 Long since, the rising rebels he withstood
 In regions waste beyond the Jordan's flood . . .
 In exile for his godlike prince he mourn'd ;
 For him he suffer'd, and with him return'd."
- k. "The gracious dew of pulpit eloquence,
 And all the well-whipt cream of courtly sense,
 That first was H—'s, F—'s next, and then
 The S—'s, and then H—'s once again."

The Candidates were further examined vivâ voce, as follows, on the English Language, and the History of English Literature:—

1. What are the translations from the Latin attributed to King Alfred?
2. What are the only two Anglo-Saxon works in verse, of considerable length, which have come down to us?
3. One prose romance in Anglo-Saxon has been discovered; what is the subject of it?
4. If we adopt Mr. Craik's scheme of the history of our language, with what writer will the third period begin?
5. In some of the compositions in verse before Chaucer's time we have rhyme, in others alliteration; can you mention any in which both appear?
6. Can you name one in which there is neither rhyme nor alliteration?
7. There were four regular metres in use before Chaucer's time; what poems of Chaucer are written in these metres?
8. Dr. Nott is very unhappy in his nomenclature when he gives to all the forms of versification before Surrey the common name of "verses of cadence"?
9. It is plain that Chaucer himself considered his verse in the "Troilus and Creseide" to be metrical?
10. Mr. Marsh calls attention to an interesting original passage inserted in Chaucer's version of the "Roman de la Rose;" what is the subject of this passage?
11. It is not at all certain that Chaucer was under any obligation to Italian literature; this appears from an examination of the three cases in which such obligation has been commonly assumed?
12. In which of his writings does Chaucer protest against the use of the French language by Englishmen in their literary compositions?
13. It has been commonly, but erroneously, supposed that "Piers Ploughman" is more purely English than Chaucer; how does Mr. Marsh account for this prevalent mistake?
14. Of what work does Mr. Marsh say that it "exerted, directly and indirectly, a more powerful influence on the English language than any other single production between the ages of Richard II. and Elizabeth"?
15. Mr. Craik mentions one antique form which is much more frequently used by Barbour than by Chaucer?
16. What was the aim of the new school of Scottish poetry, of which Gawin Douglas was the founder, or, at least, the chief representative?
17. What poem of Skelton's does Mr. Craik consider to be in his happiest vein?
18. What are the principal Latin and English writings of Chief Justice Fortescue?
19. On what ground has it been argued that the "Life and Reign of King Edward V.," commonly ascribed to Sir Thomas More, was not his work?

20. In what political work of the nineteenth century is Sir Thomas More introduced as an interlocutor?

21. Hallam remarks on the originality of the "Shepherds' Kalendar," as compared with other pastoral writings of the same age?

22. There are two different kinds of allegory in the "Faëry Queen"? What is meant by Irena in the fifth Book?

23. Mr. Hallam remarks that Spenser seems to have been deficient in one attribute of a great poet?

24. Point out some blemishes in the "Faëry Queen" arising from this defect.

25. The common eulogies on the reign of Elizabeth as a literary period require two limitations?

26. Where has Shakspeare been supposed to allude to the death of Spenser?

27. Hallam says that Shakspeare has had recourse to Cinthio's "Hundred Tales" in two instances for the subjects of his plays; what are those instances?

28. Yet elsewhere Hallam states, or implies, that it was not in Cinthio that Shakspeare found the story of "Measure for Measure"?

29. It used to be the practice of commentators to represent Shakspeare as having imitated Sophocles and other Greek authors; who put an end to these notions?

30. What were Malone's conclusions respecting the authorship of the three parts of "Henry VI."?

31. Hallam remarks that, if Shakspeare was not the author of the "Contention of the Houses," and the "True Tragedy," he must lose the credit of some of the most popular scenes in the second and third parts of "Henry VI." He mentions two such scenes in particular?

32. From what source does the account of the miracle at St. Alban's in the second part of "Henry VI." seem to have been taken?

33. Both the older dramatist and Shakspeare have fallen into an error respecting Rutland, who was killed at the battle of Wakefield?

34. The history of the son of that Lord Clifford who was killed at Towton is the subject of a fine poem by Wordsworth?

35. What is the curious discrepancy between the plays of "Henry VI." and "Richard III." with relation to the first husband of the Queen of Edward IV.?

36. What is Johnson's conjecture respecting the prologue and epilogue of "Henry VIII."?

37. What, according to Johnson, are the only parts of "Henry VIII." in which the genius of Shakspeare is visible?

38. Of what play does Hallam say that it "is perhaps the earliest of European domestic comedies that deserves to be remembered"?

39. From whose pen, and in which of his works, have we a striking description of Bacon as an orator?

40. "I first adventure: follow me who list,
And be the second English satirist."

Who was the writer of this couplet?

41. The claim Hall makes in these words appears to be unfounded?
42. Giles Fletcher attempts "to cope with Spenser even in one of his celebrated passages;" what is the passage?
43. In what play is Fastidious Brisk one of the *dramatis personæ*?
44. Can you mention any other English poem, which is in the same sort of verse, and to some extent in the same manner, as "Hudibras"?
45. "Tho' deep, yet clear; tho' gentle, yet not dull;
Strong without rage; without o'erflowing full."

Where do these lines occur, and to what do they relate? *

46. Johnson says of "Paradise Lost"—"Splendid passages, containing lessons of morality, or precepts of prudence, occur seldom." He mentions two such?

47. What is the opinion of Mr. Dunster as to the model which Milton proposed to himself in "Paradise Regained"? On what is this opinion based?

48. The fundamental principle of Neville's "Plato Redivivus" is the same as of an earlier treatise; but the conclusions are different?

49. Lord Macaulay says—"While Shaftesbury was still living, his character was elaborately drawn by two of the greatest writers of the age." One of these writers was, of course, Dryden; who was the other?

50. Who was the author of the papers in the "Spectator" signed with the letter X?

51. Who wrote the "Hymn to the Pillory"? For what publication had he been pilloried?

52. What were the political circumstances which called forth Swift's "Discourse on the Contests and Dissensions at Athens and Rome"?

53. Johnson says of Pope—"He published imitations of different poems of Horace, generally with his name, and once, as was suspected, without it." What was the anonymous imitation here spoken of?

54. "Content to dwell in decencies for ever."
Of which of Pope's characters does this form a part? Who is believed to have been the person intended?

55. Where in our literature does the "Man in Black" appear? and who is thought to have been the original of the portrait?

56. What novelist has drawn the character of Lismahago; and in which of his works?

57. What was the "Rolliad," and after whom was it named?

58. Who was the author of "Vindiciæ Gallicæ"? To what work was it intended as a reply?

59. There is one excellence in which Mr. Marsh considers Coleridge to surpass all other English writers, and on account of which his prose is very valuable to students of our language?

60. In what poem has Wordsworth given us a history of himself, and of the growth of his own mind?

61. Archbishop Trench, in his "Study of Words," mentions "megrim" as a word of Greek descent; what is its derivation?
62. In "Romeo and Juliet" Capulet calls his daughter "a whining mammet;" whence does this word "mammet" appear to have come?
63. What is the derivation of the word "parchment"?
64. "As he whose brow, with homely *biggen* bound,
Snores out the watch of night."—2 HENRY IV. iv. 4.
What is the derivation of "biggen"?
65. What was the origin of the vulgar word "dog-cheap"?
66. What is the true account of the word "livelihood"?
67. What is the real etymological nature of the word "welkin"?
68. Explain the formation of the words "which" and "such."
69. What was the force of the Anglo-Saxon *ge* when prefixed to substantives?
70. How do you account for the double usage—"I think," and "methinks"?
71. What is Mr. Marsh's observation concerning the origin of English words expressing family relationship?
72. Mr. Marsh remarks that the strict conformity of an English word to the Latin orthography does not prove that it was first borrowed from the Latin rather than from the French?
73. Mr. Marsh notices the arbitrary changes in the forms of English words introduced by the balladmongers of the fifteenth and sixteenth centuries; with what class of forms did they take the greatest liberties?
74. It has been observed that in the Anglican Prayer-book there is sometimes what seems a studied combination of Latin and Saxon words expressing the same idea ("acknowledge and confess," "dissemble nor cloke," "assemble and meet together"); Mr. Marsh remarks the same practice in an English writer of the reign of Elizabeth?
75. We can point to an instance of a newly developed inflexion in a group of languages cognate with our own?

COMPOSITION.

1. "Le style, c'est l'homme."
2. Mr. Craik observes that in Chaucer there is "a wonderful combination of contrasted and almost opposite characteristics"—"all that is best both in poetry and in prose, at the same time." Developpe this remark.
3. Write an Essay on the Female Characters of Shakspeare.
4. State and discuss the theory lately propounded by Mr. Robert Chambers concerning the Ballad Poetry of Scotland.
5. Write out the plot of "All's well that ends well," or of "As you like it."
6. Write a critique on one of the Waverley Novels.

(Candidates will select for themselves any *two* of the subjects given above.)

Moderatorships in Logics and Ethics.

Examiners.

JAMES H. TODD, D. D., Regius Professor of Hebrew.

JOHN A. MALET, D. D.

THOMAS K. ABBOTT, M. A.

THOMAS E. WEBB, LL. D., Professor of Moral Philosophy.

DR. WEBB.

1. Point out the distinction and relation between the *Form of Thought* and *Formal Thinking*.
 2. Show that the expression *Negative Thinking* is properly applicable to both Positive and Negative Ideas.
 3. What, according to Mansel, is the weak point in the opinion of Kant as to *Unity* and *Substance*? How does Mansel propose to obviate the consequences of this opinion?
 4. Point out the difference between a Hypothetical Theory and a Theory obtained by Induction. Stewart conceives that Hypothetical Theories have been unjustly censured.
 5. Hume has himself suggested the idea, which was subsequently enounced by Reid and Stewart, as the best solution of the difficulty with respect to Physical Causation?
 6. Point out the passages in which Locke anticipates the Kantian distinction between
 - a. *a Priori* and *a Posteriori* Cognitions;
 - β. *Analytic* and *Synthetic* Judgments.
 7. Locke distinguishes between the *Origin of Ideas* and the *Origin of Knowledge*? Show the importance of this distinction by a reference to the views of Mansel.
 8. Mathematical Principles, according to Mill, are manifestly inapplicable to the improvement of other Sciences in three cases?
 9. Mill states a *Paradox* which leads to the real principle of Generalization concerning the properties of Numbers?
 10. Is Induction *per enumerationem* necessarily an illicit Logical Process? Is Mill's theory really liable to the charge of *Petitio Principii*?
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MR. ABBOTT.

1. Discuss the question whether it is possible to attend to several objects at once.
2. Give the substance of Sir W. Hamilton's proof of the existence of Mental Modifications of which we are not conscious.

3. How does Sir W. Hamilton show that Vision is the sense pre-eminently percipient of extension?
4. State Sir W. Hamilton's Theory of the Sublime and Beautiful.
5. Discuss the question whether in Perception the knowledge of the whole or the parts is first.
6. Explain shortly the several views which have been entertained with respect to the nature of General Notions.
7. Show fully for what reasons Syllogism is useless in physical inquiries according to Bacon.

CICERO.

DR. TODD.

1. Explain the difference between the two questions in ancient philosophy, "de summo bono et malo," and "de fine bonorum et malorum."
2. What common principles in this discussion were assumed by all the philosophical sects?
3. The Stoics employed the word Virtue in a larger sense than other Philosophers, and why?
4. State the argument of the Peripatetics, that the Stoical doctrine of the "summum bonum" is founded on a false analysis of human nature.

MR. ABBOTT.

1. Describe the relation of Plato's Philosophy to the state of philosophical opinion in his day.
2. Butler remarks that "the most characteristic description of the Platonic speculative system might perhaps be, that it translated Pythagorism into its metaphysical correlatives." Explain and illustrate this remark.
3. Give the substance of the Ideal Theory of Plato according to the views of Professor Butler.
4. State and explain the doctrine of Reminiscence.
5. Give an account of the Platonic Conception of Matter.
6. What objections does Aristotle suppose to the utility of *φρόνησις* and *σοφία*, and how does he reply?
7. Illustrate from Aristotle the following passage: *τῶν διὰ τὴν ἕξιν τὰ αἰσθητήρια γεγυμνασμένα ἔχόντων πρὸς διάκρισιν καλοῦ τε καὶ κακοῦ.*
8. Show that Ethical Virtue is *τοῦ μέσου στοχαστικῇ*.

DR. MALET.

1. Define, generally, an argument from Final Causes, and mention applications of it in the "Analogy" and "Sermons."

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2. State and explain the various proofs for the existence of God mentioned in Butler and Stewart.
3. Give, at some length, Butler's discussion on the various senses of the precept, "Love thy neighbour as thyself."
4. Give an abstract of his Sermon on the Government of the Tongue.
5. State his account of the character of Balaam, and his application to mankind in general.
6. What practical good results follow from Christianity being left on doubtful evidence?
7. State some of Butler's answers to the objections against arguing from Analogy in Religion.
8. What *form* does the question of the Evidence for the Christian Miracles necessarily take? How does Butler answer the objections taken from spurious Miracles? also from Enthusiasm?
9. From what does Grotius derive the obligations of Morality and Law? What is his description of Natural Law?
10. Explain what Macintosh means by the "Theory of Morals." What remarks does he make on this application of the word "Theory"? Explain also what is meant by the "History of Ethics," "Theory of Moral Sentiments," and "Criterion of Morality;" and what confusion respecting them has led to much error among many writers?

LLOYD EXHIBITION EXAMINATION.

MATHEMATICS.

MR. M. ROBERTS.

1. If the centre of the curve $A'(x-a)^2 + B'(y-\beta)^2 = 1$, which is inscribed in a self-conjugate triangle with respect to $Ax^2 + By^2 = 1$, lies on this latter curve; find the relation between A , B , A' , B' .

2. Find the equation of the three pairs of lines which join the four points of intersection of the curves

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - 1 = 0, \quad x^2 + y^2 - ax - \beta y = 0.$$

3. Reduce to its simplest form the expression

$$\frac{3a^2}{(x^2+a)^{\frac{3}{2}} \sqrt{x^2+2a}} - \frac{d}{dx} \frac{x \sqrt{x^2+2a}}{(x^2+a)^{\frac{3}{2}}}.$$

4. Find the value of the integral

$$\int \frac{\sin 4\theta}{\cos^6 \theta} d\theta.$$

5. Integrate the expression

$$\int \frac{d\theta}{(a+b \cos \theta)^2}.$$

6. Prove that the equation

$$x^4 + (2q - p^2)x^3 + (q^2 + 2s - 2pr)x^2 + (2qs - r^2)x + s^2 = 0$$

has a double root if $r^2 - pqr + p^2s = 0$.

7. If $a\beta + a\gamma + a\delta + \beta\gamma + \beta\delta + \gamma\delta = 0$, prove that

$$\{ (a-\beta)^2 (\gamma-\delta)^2 + (a-\gamma)^2 (\beta-\delta)^2 + (a-\delta)^2 (\beta-\gamma)^2 \}^2 = 18 \{ (a^2 - \beta^2)^2 (\gamma^2 - \delta^2)^2 + (a^2 - \gamma^2)^2 (\beta^2 - \delta^2)^2 + (a^2 - \delta^2)^2 (\beta^2 - \gamma^2)^2 \}.$$

8. If $\alpha, \beta, \gamma, \delta$ are the roots of the biquadratic

$$a_0 x^4 + 4a_1 x^3 + 6a_2 x^2 + 4a_3 x + a_4 = 0,$$

calculate the symmetric function $\Sigma \alpha^2 \beta^2 (\alpha - \beta)^2 (\gamma - \delta)^4$.

MECHANICS.

PROFESSOR JELLETT.

1. A uniform beam AB, whose weight is W, rests upon a horizontal and against a vertical plane, and is supported by a cord attached to its centre C, passing over a pulley P situated in the vertical plane at a

height OP , and sustaining a weight W' ; show by the principle of virtual velocities that there will be equilibrium if

$$\frac{W}{W'} = \frac{OP}{CP}.$$

2. Two beams AC , CB , are connected by a hinge at C , and by a cord attached to A , B ; they are then placed with their extremities A , B , on a smooth horizontal plane, their plane being vertical, and a given weight is laid on the top C ; find the tension of the cord.

3. A stick passes over the lower of two rough pegs, and under the other, the pegs being equally rough; find the distance of the centre of gravity of the stick from either peg when equilibrium is on the point of being broken.

4. Two equal circular cylinders are connected by a cord rolled round them in opposite directions; they are then placed on an inclined plane so rough as to prevent sliding, the cord being drawn tight, and perpendicular to the axes, which are horizontal; what will happen?

5. If the cylinders be unequal, find whether equilibrium be possible; and, if so, determine the conditions.

6. If a cone of the same substance and of equal base with a hemisphere be attached to the latter so that their bases coincide; find the greatest height of the cone in order that equilibrium may be stable when the hemisphere rests on a horizontal plane.

7. A particle descends the convex side of a circle, starting from a given point; determine when it will leave the circle.

8. Find the series for the time of vibration of a circular pendulum.

ASTRONOMY AND OPTICS.

MR. TOWNSEND.

1. Given the lengths of the two terrestrial degrees, meridional and orthogonal, corresponding to a given latitude; required, in terms of them and the latitude, the exact values of the equatoreal and polar radii of the Earth.

2. In determining the meridian by observing when two known stars, whose right ascensions are nearly equal or opposite, are in the same vertical plane; required the correction to be applied in consequence of their difference of right ascension not being exactly 0 or 180°.

3. In determining the latitude and apparent time by observing two altitudes of the sun, and noting the interval of time between the observations; required the corrections to be applied in consequence of the necessary corrections in the observed altitudes.

4. If the components in right ascension and declination of the aberration of a fixed star be represented at every instant by the rectangular coordinates of a curve; show that the curve will be an ellipse, and determine its equation.

5. When two planets appear stationary with respect to each other, investigate the equations which give their arguments of latitude; the ele-

ments of their orbits, supposed to be elliptic and inclined to the ecliptic, being given.

6. If a ray of light traverse a medium composed of concentric spherical strata varying in density according to any law, its motion being in a plane passing through the common centre of the strata; investigate the differential equation of its path.

7. An object of small but sensible magnitude being placed successively at distances of 16, 12, 8, and 4 feet from a concave mirror of 6 feet focal length; exhibit, by figures, the circumstances of its images in the several cases.

8. If a thin convex lens of the same focal length be substituted for the concave mirror in the preceding question; exhibit again by figures the circumstances of the images of the object in the several cases.

9. A halo being supposed formed by the transmission of the Sun's rays through prisms of ice suspended in the atmosphere; required its angular diameter in terms of the refractive indices and angles of the prisms.

10. Determine the angular breadth of a rainbow of any order in terms of the apparent diameter of the Sun, and of the refractive and dispersive powers of the water composing the drops of rain.

EXAMINATION FOR DEGREES IN MEDICINE.

PRACTICE OF MEDICINE.

DR. BANKS.

1. Describe the different forms of mental disturbance in typhus fever.
2. Under what circumstances do convulsions occur in typhus fever?
3. What are the characters of the urine in typhus fever? and how does the state of the urine influence the prognosis?
4. What are the most dangerous complications in typhus fever?
5. What are the different modes of death in typhus fever?
6. What are the indications for the operation of thoracentesis?
7. What are the sequelæ of diphtheria?
8. What treatment would you adopt in the different stages of Bright's disease?
9. Give the symptoms and treatment of peritonitis from intestinal perforation.
10. Give the characters which distinguish hæmoptysis from hæmatemesis.

DR. M'DOWEL.

1. Define and describe the proper olfactory region.

2. Describe the oblique muscles of the eye, and assign their uses.
3. The peculiarities of the temporal bone in the infant.
4. Describe the middle lobe of the cerebrum, and the different objects contained within it.
5. The chemical composition of nervous matter.
6. Enumerate the most important of the urinary constituents; state the average amount of each found in healthy urine.
7. Describe the os hyoides, and enumerate the different parts attached to it.
8. Describe the vascular anastomoses about the knee and ankle joints.
9. The anatomical groundwork of Virchow's cellular pathology.
10. The distribution of the ulnar nerve, and its anatomical relations in the forearm.

MATERIA MEDICA.

DR. AQUILLA SMITH.

1. Describe the process for making Tinctures by percolation. Name two or more of the Tinctures which are not made by percolation; and give the reason for preferring the process by maceration.
2. Name the Tinctures which are prepared from animal substances; and state the therapeutic action and dose of the one which is prepared by percolation.
3. How much Ergot of Rye is equivalent to one fluid drachm of "Extractum Ergotæ Liquidum"?
4. Describe the "Cassia Fistula;" the method of preparing the pulp; state its medicinal action, and the preparation of which it is a constituent.
5. Enumerate the preparations of Colchicum in the "British Pharmacopœia;" state the part of the plant from which each preparation is made, and the dose of each preparation.
6. State the composition of "Mistura Creasoti," and the tests for pure creasote.
7. Give the official names and natural orders of at least three of the indigenous plants which are in the "Materia Medica" of the "British Pharmacopœia."
8. State the composition of "Pulvis Jalapæ Compositus" and "Pulv. Scammonii Compositus," and the dose of each.
9. In what respect does the eruption produced by the external application of Croton Oil differ from that produced by Tartar Emetic?
10. Write a prescription in Latin, without symbols or abbreviations, for a draught containing Oil of Turpentine as its chief ingredient.

CHEMISTRY.

DR. APJOHN.

1. Explain the manner of obtaining an inductive electric current; give the rule by which its direction is known, and describe the apparatus by

which it is developed with the view of its application as a therapeutic agent.

2. Mention the successive steps in the construction of a mercurial thermometer, and the precautions to be observed in taking the fixed points; give also the temperature of water at its point of maximum density as it would be shown by a Centigrade, a Reaumur, and a Fahrenheit instrument.

3. How, in a case of sciatica, would you perform electropuncture; and why is the withdrawal of the positive needle, when the operation is concluded, productive of considerable pain?

4. The several metals are, with a view to practical chemistry, resolved into five groups; mention a couple of metals belonging to each group, and specify the reagents which are employed in distinguishing the groups from each other.

5. Nitrogen may be obtained from water of ammonia, and from nitrite of ammonium; give the theory of each process.

6. How is ferri sulphas granulatum made, and how is it converted into ferri persulphas? State also the reagents by which they are best distinguished from each other, and the reactions which ensue upon contact of these reagents with the chalybeate salts.

7. How is the calx chlorata of the Pharmacopœia made? what is the view at present taken of its composition; and what change does it experience when brought into contact with an excess of muriatic acid? Lastly, describe the volumetric process for estimating its strength.

8. What is the process by which tartaric acid may be extracted from the acid tartrate of potash? mention also how a solution of it may be distinguished from one of citric or oxalic acid.

9. When pulverized litharge, olive oil, and a little water are digested together at the temperature of 212° , two products are formed; how are they named; and what is the precise composition of each?

10. Enumerate the proximate constituents of milk, and describe the processes by which the percentage amount of each may be determined.

BOTANY.

DR. R. PERCEVAL WRIGHT.

1. Give some of the chief distinctions between Plants and Animals.
2. What is the difference between Morphological and Histological Botany?
3. What structures are found in the majority of young cells?
4. What difference is there between Protoplasm and Cell-sap?
5. Enumerate the different forms of definite and indefinite Inflorescence.
6. Give the genera of *Ranunculaceæ* of most importance to the medical man.
7. What kinds of fruit are met with in the order *Urticaceæ*?
8. To what order does the genus *Gossypium* belong?

9. Enumerate the most remarkable genera of the order *Rubiaceæ*.

10. Name the order of which the following is the diagnosis:—Herbs with alternate leaves, sheathing at the base, mostly multifid; the flower with adherent calyx, limb five-toothed; the five petals and five stamens inserted on the disk crowning the ovary, and surrounding the base of the two styles; the fruit consisting of two separating, seed-like, dry carpels.

EXAMINATION FOR DEGREES IN SURGERY.

DR. ADAMS.

1. Mention the cases of stone in the male bladder in which you would prefer to recommend the operation of lithotomy to that of lithotrity.

2. In a case in which you had determined to perform the operation of lithotrity, what preliminary examination and treatment would you advise?

3. Suppose a case of stone in the bladder in which you were called upon to determine the question as to the propriety or not of performing the operation of lithotrity, what are the circumstances not unfrequently found to exist which might in such a given case deter you from operating by lithotrity?

4. Mention the general and precursory symptoms which usually usher in an attack of erysipelas of the head.

5. Suppose a case of erysipelas of the head and face in which the redness of the skin had suddenly receded, and at the same time coma and other head symptoms had supervened, what treatment would you adopt in such a case?

6. Suppose the above-mentioned case proved fatal, what *post-mortem* appearances might you expect to find within the cranium?

7. Describe the most usual form of simple luxation of one of the phalanges of the thumb.

8. As a general rule, in the surgical treatment of a severe anthrax (of the back of the neck, for example), which would you prefer the mode of treatment by compression, &c., &c., or that by a crucial incision?

9. The symptoms and treatment of fissure of the anus?

10. The rational signs, symptoms, and surgical treatment of an ulcer of the rectum?

DR. R. W. SMITH.

1. Describe the operation for strangulated umbilical hernia.

2. What error may be committed in the attempt to replace the protruded intestine?

3. What would be your treatment in a case of wound of the abdomen, accompanied by protrusion and wound of intestine?

4. In what cases are the results of lithotomy most unfavourable?
 5. Mention the causes, dangers, and treatment of retro-pharyngeal abscesses.
 6. What abscesses require to be opened at a very early period?
 7. Modes of treating chronic abscess?
 8. In what cases of internal collections of matter have drainage tubes been successfully employed?
 9. Give a short description of hectic fever.
 10. Describe urinary fever.
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RELATIVE AND SURGICAL ANATOMY.

DR. M'DOWEL.

1. Give the boundaries of the posterior chamber of the aqueous humor.
2. The bony boundaries of the nasal duct.
3. Trace the lachrymal nerve from its origin to its termination.
4. Describe the dissection necessary to expose the sublingual gland.
5. Describe the operation for applying a ligature on the external carotid artery, and mention the conditions for which it might be required.
6. Enumerate the muscles attached to the scapula.
7. The inguinal relations of the spermatic cord.
8. The sources of the nervous supply of the testicle.
9. Describe the fasciæ of the perineum.
10. Describe the true ligaments of the bladder.

THEOLOGICAL EXHIBITION EXAMINATION.

 Hilary Term.

PROFESSOR OF DIVINITY.

HEBREW.

Isaiah, xli., xliii., xli., xlviii., liii., lvii., lxx., lxxvi.

A.—1. The *locus classicus* respecting the three terms נָבִיא, רֹאֶה, דַּוִּד occurs in 1. Chron.?

2. State the distinction between these three words.

3. The comparison of two passages in Isaiah shows the relation between נָבִיא and רֹאֶה. And a passage in 2. Sam. throws light upon the relation between נָבִיא and דַּוִּד?

4. Two of the Hebrew Prophets are designated by both titles, נָבִיא and דַּוִּד? Point out the reason of this in each case.

5. Two of the most eminent נָבִיאִים were also priests?

B.—1. Write in Hebrew "Isaiah the Son of Amos." Whence the Jewish notion that he was of royal blood?

2. In the Chronicles one *historical* work of his is mentioned?

3. Isaiah's ministry extended through four successive reigns? Within that period fall two of the most noted eras of Chronology?

4. The description given of Isaiah by the Son of Sirach is very striking?

5. State the principal objections urged against the Isaian authorship of the latter chapters (xl.-lxvi.).

6. State the external and internal evidence in its favour.

7. The twenty-seven chapters of the second part fall into three principal sections, each of which ends in a similar manner?

8. In the twelfth chapter of St. John's Gospel we have two quotations from Isaiah, which show that the Evangelist regarded the earlier and later parts of the book as having the same author?

9. Write the word Cyrus in Hebrew. In one of the earlier chapters a very similar word, with a similar meaning, occurs? What is its (*viz.* Cyrus') probable etymology? Isaiah seems in more than one passage to allude to this etymology? There is a remarkable parallel between this and the only other case in which a person is predicted *by name*?

10. Write a note on the words בְּשֵׁיטָא, קָמָא, פֶּלֶא.

11. The phrase עַד יְהוָה is used by Isaiah in various senses? State the heads of the proof by which its Messianic application is established. There are five places in the N. Test. in which the corresponding Greek phrase is applied to our Lord?

C.—1. Is. xli. 25. הַעֲרֹחִי מִצֵּפֶן וְהָאֵת מִמִּזְרָח־שֶׁמֶשׁ יִקְרָא בְשִׁמִּי
וְהָאֵת מִמִּזְרָח־שֶׁמֶשׁ יִקְרָא בְשִׁמִּי

(a). Punctuate and translate this verse.

(b). How has the geographical difficulty been accounted for?

(c). One word here has been adduced as proving the later date of this chapter? Answer?

2. Is. xliii. 14. מִדְּמַי יְהוָה גָּלִימָה קִדְשׁ יִשְׂרָאֵל לִמְעַנְכֶּם שְׁלֹחִי
בְּלֹה וְהוֹדֵחִי בְּיָדִים כֻּלָּם וְנִשְׁדִּים בְּאֵיזֹת רַחֵם :

(a). Punctuate and translate this passage.

(b). What is the LXX. and Vulgate Version, respectively, of בְּיָדִים? What is the English Version of the word, and the marginal rendering?

(c). How does the Targum explain בְּלֹה שְׁלֹחִי?

3. Is. liii. 4. אֵכֶן הָלִינוּ הוּא נֶשָׂא וּמִסָּבִינוּ * סִבְלָם
וְאֵבָנוּ חֲשַׁבְנוּ נָנוּעַ מִפֶּה אֱלֹהִים וּמַעֲנֶה :

(a). Punctuate and translate this verse.

(b). Explain the Masoretic Note * קרי הוא קרי.

(c). The vicarious suffering of Christ is asserted in the first clause? St. Matthew's quotation of it has been supposed, but without reason, to invalidate this doctrine?

(d). The Vulgate renders נָנוּעַ in accordance with an old Jewish notion?

(e). By a slight change in the Masoretic punctuation, Bellarmine and others have endeavoured to elicit from the latter clause a proof of the Divinity of Christ?

4. Is. liii. 8. מִעֲצֵי וּמִשֶּׁמֶט לֶקַח וְהָאֵת מִי יִשְׁחָזֵק
כִּי נִגְזַר מֵאֶרֶץ חַיִּים מִשֶּׁמֶט עִמִּי נָנוּעַ לְמוֹ :

(a). Punctuate and translate.

(b). In rendering the first three words our Version follows the Syriac? What is our Marginal translation?

(c). How are these words rendered in the LXX. and in the N. Test.?

(d). What is Hengstenberg's translation of the last clause of the verse?

5. Is. lvii. 6. בְּחֹלֶק־נְהַל דֹּלֶקֶת :
Write a note on these words.

6. Is. lxy. 3, 4. וְנִדְחִים בְּנִגְזֹת וּמִקְדָּרִים עַל־דִּלְגָּנִים :
הַיִּשְׁנִים בְּקִבְרִים וּבְנִצְוֹרִים יִלְנוּ

(a). Punctuate and translate.

(b). Write a note on לָבִים. A passage in Jeremiah seems to throw light on the meaning?

(c). What words are added by the LXX. after לִינוּ, and what is their meaning?

7. Is. lxx. 11. אֲנִי עֹבֵי יְהוָה הַשְׂכֹּדִים אֲדֹדֵי קֹדֶשׁ

הַשְׂכִּים לֹא שִׁלּוֹן הַמִּטְלִים לֹא מִטְכָּן :

(a). Punctuate and translate.

(b). What is the LXX. Version of the second clause?

(c). Two passages in Jeremiah seem to throw light on the last three words?

(d). The word שִׁלּוֹן seems to refer to a well-known heathen rite?

8. Is. lxxvi. 17. הַמִּתְקַדְּשִׁים הַמְשֹׁדִּים אֲלֵהֶנָּה אֲדֹדֵי בָרוּךְ

אֲלֵי בָשָׂר וְחֵזֶק הַשִּׁקָּץ הַעֲבָרָה יָדֹו יִסֹּו נִמְסִידָהוּ :

(a). Punctuate and translate.

(b). What is the English Version, and Marginal rendering, of אֲדֹדֵי אֲדֹדֵי? In each case a reading different from the Masoretic text is followed?

(c). State and explain the LXX. Version of בָרוּךְ.

(d). What is the Vulgate Version of אֲדֹדֵי אֲדֹדֵי, and how do you account for it?

(e). Henderson finds in the first clause a remarkable prediction of the Mohammedan religion?

(f). In the יָדֹו for אֲדֹדֵי Le Clerc discovers an allusion to Egyptian rites?

9. Give the meanings and derivations of the following words:—

בָּרָא, בְּרָאיוֹן, שָׂאן, בְּרִפְיוֹת, צַב, מִדְּבָרָה, שָׂדֶה, מִוֶּרֶךְ, פִּשְׁטִּים

OLD TESTAMENT.

DR. SALMON.

1. The form of the name Jehovah attests its own antiquity?

2. Earliest name of a person distinctly Jehovistic?

3. Earliest name of a place apparently Jehovistic?

4. How is the name of the land of Moriah translated in the Greek versions?

5. There is a place called Moreh mentioned, on what occasions?

6. On what occasion, and where, is the name Moriah given to the site of the Temple? What explanation of the name is there given?

7. How do the LXX. translate the word in this place?

8. What reasons are there for believing that the vowel points now attached to the name Jehovah do not properly belong to it?

9. Are there any instances of Jehovistic names of non-Israelites?

10. On one occasion we find an Egyptian king imposing a Jehovistic name?

11. Is the name Eli properly instanced as an Elohist name?

12. Four Jehovistic names occur in the Book of Judges?

13. What is the use of the names Jehovah and Elohim in Proverbs and in Ecclesiastes?

14. It has been urged that the names of Saul's sons indicate a change in his religious sentiments as he advanced in life?

15. The opening of the sixty-eighth Psalm coincides with a remarkable passage in the Pentateuch?

16. But with a notable difference?

17. The grammatical forms are also different?

18. Another passage in the same Psalm coincides with one in the Book of Judges?

19. In the story of Micah and the Danites, the manner in which the names Elohim and Jehovah are used is remarkable?

20. A name mentioned in the history of Samson has been thought to prove that this history is later than that of Micah?

21. What family is the Levite said to be of?

22. Phrase in the narrative which has been thought to indicate a later date of this story?

23. How does the next verse seem to explain this?

24. The history of Jephthah purports to relate to events of later date than those recorded in the closing chapters of Judges?

25. Something is stated in the first chapter of Judges which it has been thought did not take place till the time of Solomon?

26. To whom was it said, "Them that honour me I will honour; but they that despise me shall be lightly esteemed"?

27. Where is God described "as of purer eyes than to behold evil, and that cannot look on iniquity"?

28. To whom was it said, "Be sure your sin will find you out"?

29. Who are described as "faint, yet pursuing"?

30. Who said, "There is but a step between me and death"?

31. To whom was it said, "As thy days, so shall thy strength be"?

32. From what part of the Old Testament is derived the verse in the Revelation, "They said to the mountains and rocks, Fall on us, and hide us from the face of Him that sitteth on the throne"?

33. Where is King Jared mentioned? What explanations have been given of the name?

34. Who said, "Shall not the Judge of all the earth do right"?

35. Who said, "What shall we do for the hundred talents"?

36. Who said, "If I perish, I perish"?

37. When was Moses first commanded to write in a book?

38. There is an express statement in Deuteronomy that Moses wrote the Law, and committed it to the priests; with what directions?
39. There is a remarkable archaism as to the use of the pronouns in the Pentateuch?
40. There is another with reference to the use of the word *וַי*?
41. One passage in which this word occurs has been otherwise translated, viz., Gen. xxxvii. 2, "The lad was with the sons of Bilhah, and with the sons of Zilpah"?
42. Give some of the references to the Law of Moses in the Book of Joshua?
43. Earliest allusion to the Law of Moses under the Monarchy?
44. In the account of the reign of Joash there seems to be a reference to the Law?
45. In the history of the reign of Jehoshaphat there is a reference to the Law?
46. There is a distinct reference to it in the account of the reign of Amaziah?
47. What facts recorded in the Pentateuch are alluded to by Hosea?
48. What references are there to the Pentateuch in Amos?
49. There is a plain reference in an early Psalm to the overthrow of Sodom and Gomorrah?
50. Where is the Garden of Eden spoken of in the Prophets?
51. How is the word Eden translated in these places by the LXX.? and how by the Vulgate?
52. Where is the river Hiddekel mentioned again?
53. The word Nephilim, Gen. vi. 2, occurs where again?
54. How is the word Machpelah translated by the LXX.?
55. By what names is the Dead Sea known in the Old Testament?
56. What was Ezekiel's prophecy with reference to the Dead Sea?
57. We are told that Jacob gave one hundred pieces of money for his land at Shechem; how is this rendered in the margin?
58. In the last chapter of I. Chron. it is stated that ten thousand drams were offered for the Temple; what is the original of this word?
59. What is the Septuagint translation of "Abram the Hebrew"? This indicates what derivation of the word?
60. There is a passage in the account of Esau's posterity which is alleged to be inconsistent with the Mosaic authorship of the Book of Genesis?
61. Yet there had been a previous mention of the Jewish kings?
62. What did Anah find in the Wilderness?
63. Earliest mention of Philistines in the history?
64. Whence, according to Deuteronomy, do they seem to have come? and whom did they dispossess?
65. Whom did the Edomites dispossess?

66. What is the Septuagint translation of "Gad, a troop cometh"?
67. What account is given of the origin of the name Issachar?
68. Was there any judge of the tribe of Issachar?
69. There was an Issacharite dynasty of kings of Israel?
70. When was this dynasty established? On what occasion?
71. What cities did Asa build when Baasha was called away?
72. In a later history Asa's fortification at Mizpah is made mention of?
73. What warning had Gedaliah received of the danger which threatened him? Under whose influence had Ishmael slain him?
74. The murder had been committed with great secrecy?
75. What is told about Gedaliah's father?
76. Who was rewarded for his kindness to Jeremiah in prison?
77. A calamity which befell Ephraim is mentioned in the Book of Chronicles?
78. The word teraphim is used where only a singular is intended?
79. On what other occasions are they mentioned?
80. Methods of divination which Ezekiel represents the king of Babylon as using when choosing his course?
81. The name man of God, applied to prophets in Samuel and Kings, used of whom elsewhere?
82. The name Shiloh, how translated by LXX.? The word in this sense seemingly alluded to by Ezekiel? How is it translated by the Jerusalem Targum?
83. How is the passage translated if Shiloh be taken as the name of a place?
84. The passage about Simeon and Levi in Genesis has been alleged to contain a Greek word?
85. Blessing of Judah in Deuteronomy?
86. The blessing of Reuben in Deuteronomy has been otherwise translated?
87. What is apparently alluded to in the commendation given to Levi in Deuteronomy?
88. What imprecation occurs in the blessing in Deuteronomy?
89. Superiority of Ephraim to Manasseh, how indicated in Deuteronomy?
90. What tribe is omitted in the blessings in Deuteronomy?
91. On what occasion is there reason to think that the numbers of the tribe of Simeon had greatly diminished? Reason for thinking this?
92. A note at the end of the history of the manna has been thought to be unlike what a contemporary would have written?
93. Potiphar, "captain of the guard," how translated by the LXX.?
94. What was to be cried before Joseph?
95. Who was Aaron's wife?

96. Another high priest's wife had a name essentially the same ?
97. Of which of Joseph's brethren is the age when he died mentioned ?
98. The account of the veil on Moses' face differs in the Hebrew and the Septuagint ?
99. When were the Canaanites expelled from Gezer ?
100. What account does Joshua give ?
101. Different name for the priests in Deuteronomy and in the other Books ?
102. Ezekiel has a peculiar name for the priests ?
103. The time when the gathering of sticks on the Sabbath day is said to have taken place has been alleged to be inconsistent with Mosaic authorship ?
104. Colenso objects to the name given to the west wind as inconsistent with Mosaic authorship ?
105. Where is David called the man after God's own heart ?
106. Who, besides Barzillai, showed him kindness when he fled from Absalom ?
107. Machir mentioned on what other occasion ?
108. Dean Stanley's reason for supposing that there may have been a family connexion between David and Nahash ?
109. When David went down to Saul's camp, who besides Abishai is mentioned as invited to come with him ?
110. A difficulty has been felt as to the account given of what became of the head of Goliath ?
111. What office did Zadok hold in David's lifetime ?
112. What office did Benaiah hold ?
113. What office did David's sons hold ?
114. Reason given in Chronicles for the fall of Saul ?
115. What account of Ishbosheth's reign is given in Chronicles ?
116. David's war against the Philistines assumed a religious character ?
117. We read incidentally of the severity with which the war against Edom was carried on ?
118. One passage in the Book of Samuel, it is considered, shows that it was written after the separation of the kingdoms ?
119. Moses is only once mentioned in Samuel ?
120. One verse in Hannah's song has been thought to indicate a later date than it bears ?
121. What office was held by Doeg ?
122. First place where the word Messiah occurs ?
123. First chronological date in Kings ?
124. David is mentioned as using chariots ?

125. What did Solomon import from Egypt, besides horses ?
126. For whom does it say he imported horses ?
127. Kings of Hittites are mentioned on what other occasion ?
128. What was done with the almug trees which came from Ophir ?
129. Mode of consecration to the priesthood used by Jeroboam ? Who tells this ?
130. Where are Nazarites spoken of in the Prophets ?
131. In the history of the disobedient prophet, it has been said that the words put into the mouth of the old prophet contain an anachronism ?
132. In the account of the death of Ahab and the washing his chariot, the LXX. have a curious variation ?
133. The life of Jehu purports to be written before the destruction of Samaria ?
134. "Had Zimri peace"—how otherwise translated ?
135. This Zimri has been identified with another Zimri, mentioned in Chronicles ?
136. There was another usurping king of Israel whose reign was nearly as short ?
137. How far does it say Solomon's dominion extended ?
138. Where is Azzah mentioned again ?
139. Who are we told did not take part in Adonijah's conspiracy ?
140. The account of the death of Ahaziah is different in Kings and Chronicles ?
141. What place was Sennacherib besieging when he sent to Hezekiah ?
142. What other fenced city is it said was alone left to Judah ?
143. When were these cities fortified ?
144. Are Elijah and Elisha mentioned in Chronicles ?
145. What mention of the prophet Jeremiah is made in Chronicles ? What of Isaiah ?
146. There was another Jeremiah ?
147. Against what place was Necho going when Josiah met him ?
148. On what grounds has it been inferred that Jonah was of Galilee ?
149. Apparent allusion in Isaiah to Hezekiah's marriage ?
150. A passage seems to imply that he was childless fifteen years before ?
151. What is the word translated "the grove" ? One passage shows that this translation cannot be correct ?
152. What difference is there between the accounts given of Manasseh in the Kings and in the Chronicles ?
153. By whom is Manasseh stated to have been taken, and where ?
154. Isaiah has one prophecy against an individual ?

155. So has Jeremiah?
156. So has Amos?
157. Preparations for defence made by Manasseh on his return?
158. It has been imagined that these preparations are alluded to by Zephaniah?
159. We are told of a visit paid to Babylon by Zedekiah in the fourth year of his reign? Who accompanied him?
160. What opportunity did Jeremiah use to attempt to escape from Jerusalem before its final siege?
161. Had Jeremiah ever visited Babylonish territory?
162. Jeremiah quotes Micah, on what occasion?
163. "I have cried concerning this, Their strength is to sit still." How else have these words been translated?
164. What passages in the later chapters of Isaiah are supposed to be inconsistent with the date ascribed to them?
165. Micah's prophecy commences with the last words of his namesake?
166. With reference to Joel, Samuel's son, there is a singular corruption of the text?
167. What enemies of Judah are spoken of by the prophet Joel?
168. What is the date prefixed to the prophecies of Amos?
169. What prophecy of Amos has it been said failed? And what can be said in reply?
170. What Greek words are found in the Book of Daniel?
171. Who is the first Assyrian king mentioned? What reason is there for supposing him not to have been the aggressor in his war with Israel?
172. What supplementary regulation was made at the celebration of the second Passover?
173. What is the first Passover whose celebration is recorded in the history of the monarchy?
174. What resemblances are there between the Books of Ecclesiastes and Malachi?

NEW TESTAMENT.

REV. J. W. STUBBS, M. A.

1. In what way does the character of the vellum or parchment upon which a MS. is written bear upon its date?
2. The two materials of papyrus and parchment seem to have been alluded to in the New Testament?
3. During what centuries were MSS. written in cursive characters?

4. Remarkable peculiarity of the Codex Alexandrinus with regard to breathings and accents?

5. What is the earliest example of continuous writing being broken up into separate words?

6. What writer first applied stichometry to the New Testament, and in what year?

7. How does it appear that the sections of the Codex Vaticanus have been copied from some older MS.?

8. To whom are the κεφάλαια or τίτλοι attributed? What is remarkable as to their commencement in the Gospels?

9. What is the general order of the books in the MSS. of the New Testament?

10. In two celebrated MSS. the Acts of the Apostles follow the Pauline Epistles?

11. Two of the most ancient uncial MSS. contain writings in addition to the Canonical Scriptures?

12. What evidence is there that the present Syriac Version was made before the fifth century?

13. What Books of the New Testament are omitted in the Peschito Version?

14. Which is the earliest dated MS. of the Peschito?

15. Bishop Walton interpolated one passage in his edition of the Peschito taken from the Paris Polyglott; what is the passage, and upon what authority did he insert it?

16. What are the oldest and best MSS. of the Vetus Itala, and of the Vulgate?

17. What is Bengel's prime Canon of Criticism in the case of the conflicting testimony of MSS.?

18. How is S. John, vii. 39, an instance of this?

19. There is only one allusion to the autographs of Scripture to be found in Christian antiquity?

20. We have an express testimony to the corruption of the sacred text in the middle of the second century?

21. In what respect is Marcion's testimony of value as to ancient readings? Give an example.

22. We have very strong evidence of an early corruption in the record of the Voice at our Lord's baptism?

23. To what does Mr. Scrivener trace the origin of the disputed passage, I. John, v. 7?

24. S. Matthew, ii. 6; the reading of the Greek Text of this passage indicates a different vocalization of the Hebrew of Micah from the present one?

25. In this passage Codex D with the old Latin Version and Latin Fathers adopt a different reading?

26. S. Matthew, vi. 1; there is another reading of this text adopted by modern critics; upon what grounds does Mr. Scrivener prefer it?

27. State the testimony of MSS. and Versions for and against the insertion of the Doxology at the end of the Lord's Prayer in this Gospel.

28. What are the only parts of the Lord's Prayer as given by S. Luke which are admitted by *all* ancient authorities?

29. S. Matt. vii. 14; the alternative reading in this verse is indicated in the margin of the Authorized Version?

30. S. Matt. xix. 17; the received reading in this verse is corrected by most critics after ancient MSS.?

31. Blunt remarks an undesigned coincidence between S. Matt. xiv. 1, and S. Luke, viii. 2?

32. S. Matt. xiv. 8; the Authorized Version is incorrect in this verse; and a similar want of correctness is manifested where the same word occurs in the Acts of the Apostles?

33. S. Matt. xxiii. 35; Paley's conjecture as to the reading of this verse has been verified?

34. Who was really the last prophet slain by the Jews, and why is Zechariah put here?

35. There is a reading in S. Matt. xxiv. 34, testified by the most ancient existing MSS. which, as we have strong historical grounds for believing, was not in still more ancient copies?

36. Mr. Scrivener mentions a reading in S. Matt. xxvii. 4, adopted by some of the most ancient authorities which is yet unquestionably false?

37. What are the authorities for and against the reception of the last part of the sixteenth chapter of S. Mark?

38. Many MSS., including two of the most ancient, omit a remarkable clause in the Angelic Salutation to the Virgin Mary?

39. In S. Luke, ii. 22 and 33, the Authorized Version adopts a reading which was introduced in later ages to serve doctrinal ends?

40. The probable reading of S. John, i. 26, 27, gives a different meaning to that adopted by the Authorized Version? Olshausen thinks that a subsequent passage in this Gospel may refer to these verses?

41. The narrative in the early chapters of S. John refers to events between our Lord's baptism and subsequent return to Galilee?

42. What is the Greek word which is translated "nobleman" in S. John, iv. 46?

43. S. John, x. 16, "One fold—one shepherd;" the Authorized Version is here incorrect?

44. S. John, viii. 58, "Before Abraham was, I am;" this is better rendered by the Vulgate?

45. What is the difficulty about the statement in Acts, i. 12, that the place from which Christ ascended was a Sabbath day's journey from Jerusalem; and how does Chrysostom endeavour to solve it?

46. The apparent contradiction between the ninth and twenty-second chapters of the Acts, as to the Voice at S. Paul's conversion being heard, has been explained by some from a consideration of the cases used in the two narratives?

47. What is the difficulty concerning Aretas, King of Damascus; and how is it solved?

48. Acts, xiii. 20; Lachman's reading of this verse, supported by the four most ancient MSS., evades a chronological difficulty?

49. The names of the officers of the cities of Philippi and Thessalonica as given in the Acts exactly correspond with their political circumstances?

50. S. Paul cites three ancient poets, at least?

51. Dr. Hannah quotes some words of Lucretius which are equivalent to S. Paul's expression with regard to the Godhead, οὐδὲ ὑπὸ χειρῶν ἀνθρώπων θεραπεύεται προσδεόμενός τινος?

52. He states that S. Paul in his address at Athens appealed to three principles, for each of which he could claim a separate assent from some around him?

53. S. Paul's "new doctrine" may be divided into three parts?

54. S. Paul asserts that he had supported himself by manual labour at three places?

55. By means of a statement of Tacitus we can determine the period when the "two whole years" of Acts, xviii. 30, terminated?

56. If we read the imperative instead of the indicative in Rom. v. 1, and I. Cor. xv. 49, how would Mr. Green account for the mood used by S. Paul?

57. The erroneous rendering of a word in Rom. v. 5, in the Vulgate, led to an extended mistake as to the meaning of the verse?

58. I. Cor. ii. 13; three interpretations have been given of the words πνευματικοῖς πνευματικὰ συγκρίνοντες?

59. I. Cor. viii. 7; what is Lachman's reading of this verse, supported by three most ancient MSS.?

60. I. Cor. xiii. 12; when S. Paul says, βλέπομεν γὰρ ἄρτι δι' ἐσόπτρου ἐν αἰνίγματι, he probably referred to a passage in Numbers?

61. II. Cor. i. 11; three constructions of this verse have been given by commentators?

62. II. Cor. iii. 13; what is the sense of this verse according to the meaning of the LXX. and Vulgate?

63. What passage in II. Cor. ix. has been applied by Estius to the proof of the doctrine of Works of Supererogation? Show that this verse cannot apply to that doctrine.

64. II. Cor. vii. 16; θαρρῶ ἐν ὑμῖν is doubly mistranslated in the Authorized Version, according to Alford?

65. II. Cor. vi. 7; διὰ τῶν ὀπλῶν . . . τῶν δεξιῶν καὶ ἀριστερῶν; enumerate the various renderings of these words which have been given by commentators.

66. Gal. iii. 19; τῶν παραβάσεων χάριν προσετέθη; Bishop Ellicott mentions three different interpretations of these words; what is the force of the article here, according to Mr. Green?

67. Gal. vi. 2 and 6; the Greek word translated "burden" is different in these two verses?

68. Gal. v. 20; *ῥιθείαι* is wrongly rendered "seditious;" what is the proper meaning and derivation of the word?

69. *τὸ γὰρ Ἀγαπ Σινᾶ ὁρὸς ἔστιν ἐν τῇ Ἀραβίᾳ*; what is Lachman's reading of these words? How is the sentence as it stands rendered by Chrysostom?

70. There is a difference between S. Paul's salutations in his Epistles to churches and to individuals?

71. Ephes. i. 14, "Until the redemption of the purchased possession;" the Greek word here used is identical with a striking expression in S. Peter's first Epistle?

72. What reasons have been assigned for making *πλεονεξία* (Ephes. v. 3) mean "covetousness," and not "lasciviousness"?

73. Ephes. v. 13; what is the better way of rendering this verse?

74. Ephes. vi. 21; what supposition explains the use of the words *καὶ ὑμεῖς* here?

75. Philip. i. 1; two reasons have been assigned for S. Paul's inserting the words "Bishops and Deacons" in this verse?

76. Philip. i. 16; how does Bishop Ellicott translate this verse? The reading *ἐπιφέρειν* is now generally rejected?

77. What text has been quoted from the Epistle to the Colossians to prove that S. Paul had not founded that Church?

78. Coloss. ii. 18; correct the Authorized Version of this verse.

79. We find in the Acts of the Apostles that the larger part of the converts at Thessalonica were devout Greeks; this appears also from a casual expression in S. Paul's first Epistle to that Church?

80. I. Thess. ii. 17; state the two different interpretations which have been given of the comparative *περισσοτέρως*.

81. I. Thess. iv. 4; what are the different meanings assigned to *σκεῦος*? Why is *κτᾶσθαι* in the present tense, according to Mr. Green?

82. I. Tim. vi. 2; what is the proper translation of this verse? and what explanations of *εὐεργεσίας* have been given by modern commentators?

83. I. Tim. ii. 14; two meanings have been assigned to the words *σωθήσεται διὰ τῆς τεκνογονίας*?

84. I. Tim. ii. 9; *μετὰ αἰδοῦς καὶ σωφροσύνης*; how do these words differ?

85. In what part of the New Testament is there an express reference to Meribah and Massah? Show that it is so.

86. The Nestorians were charged with altering the reading of a word in the Epistle to the Hebrews?

87. James, i. 13, "God is not tempted of evil;" the Greek word here used is wrongly translated?

88. What words in the first Epistle of S. Peter indicate that it was written to Jews only?

89. There is an allusion in this Epistle to our Lord's parable of the Talents?

90. There is also an allusion to our Lord's washing the disciples' feet? Force of the Greek word?

91. II. Pet. i. 14, 15; there are two allusions to the Transfiguration in these verses?

92. What three examples of Divine vengeance are given by S. Jude?

93. How does Mr. Scrivener account for the large number of departures from ancient MSS. which are to be found in the last six verses of the received text of the Revelation?

94. Rev. xiii. 10; what is the correct reading of this verse, and its meaning?

95. Rev. xx. 14; *οὗτός ἐστιν ὁ δεύτερος θάνατος*—what is the most approved reading of this clause?

96. Rev. xxii. 14; a remarkable alteration of the reading of this verse has been made by modern critics?

97. S. Paul condenses in one phrase the whole controversy on the limitation of the mind of man, according to Dr. Hannah?

98. And he brings within the compass of two words the entire debate on Predestination and Free Will?

99. In two adjacent verses of S. John is contained a striking instance of Antinomy?

100. One passage of the Epistle to the Galatians brings together social sympathy and individual responsibility?

101. Dr. Hannah indicates three different modes of explanation, under one or other of which most secondary meanings may be arranged?

102. A remarkable instance of the last may be quoted from the words of S. Paul?

103. The omission of a few words in the last chapter of S. Matthew, on the authority of Codices Sinaiticus, Vaticanus, and Bezae, removes an obstacle to the arrangement of our Lord's appearances after his Resurrection?

104. Dr. Hannah refers to three occasions on which S. Peter was put forward to express formally three distinct and special advances in Christian knowledge, while his after conduct in each case proved that these truths had failed to exert a practical influence on his own heart?

105. There is no proof beyond the evidence of a doubtful reading that our Lord ever passed out of the Holy Land?

106. "Forty and six years was this temple in building" (S. John, ii. 20); what bearing has this upon the date of our Lord's birth?

107. In S. Paul's first recorded Sermon we have the germs of his Epistles to the Romans and Galatians?

108. The speech at Lystra sets forth the very same conception of Gentile knowledge as does the address at Athens?

109. The term "Scripture" is sometimes used in the New Testament as if it were synonymous with God its Author?

110. In one case S. Paul combines the Old and New Testaments under the word "Scripture"?

111. What word in the Epistle of the Church in the fifteenth chapter of Acts shows that it was the composition of S. James?

112. How does Hug account for the apparent difference in our Lord's character as drawn by S. John and by the other Evangelists?

113. In the Epistle to the Hebrews the Law, the Prophets, and the Psalms are separately adduced as the language of the Holy Ghost?

114. In a remarkable passage of S. Peter's first Epistle passages from Isaiah and Ezekiel are incorporated, unaccompanied by any observation denoting the source from which they are taken?

115. In one remarkable passage our Lord, followed twice by S. Paul, quotes a passage in Genesis from the LXX., and not from the Hebrew?

116. Ephes. iv. 8; in this verse S. Paul's quotation differs both from the LXX. and the Hebrew; what interpretation of this difficulty is adopted by Archdeacon Lee?

117. There is a remarkable case in which the Evangelists agree *verbatim* in their rendering of a prophecy in a manner different both from the LXX. and the Hebrew?

118. Archbishop Trench remarks that the force of S. Paul's retort to the charge of the Athenians is lost in the Authorized Version in a double way?

119. What is the full signification of the word which is rendered in our Version of I. Peter. v. 3, "Be clothed with humility"?

120. Philipp. ii. 15; in the rendering of the word "harmless" the Authorized Version errs from a mistake in etymology?

121. S. John, xii. 6, "He was a thief, and had the bag, and bare what was put therein"; in what way would Archbishop Trench correct this?

ECCELESIASTICAL HISTORY.

REV. DR. GIBBINGS.

The following Questions, amongst others, were proposed vivâ voce to the Candidates:—

1. By whom, and for what purpose, was the command given, that Christians should be called by the name of "Galileans" only?

2. The early Christians whence styled "Lucifugax Natio"?

3. Who is said to have been the first Bishop of Athens?

4. Mistake made by Cardinal Baronius, and some Editors of the Councils, with regard to the "Literæ Formatæ" granted by Bishops?

5. How did the Council of Laodicea, (c. A. D. 363,) first lessen the power of the Chorepiscopi?

6. According to Salmasius, the Bishop of Alexandria had the title of Patriarch from a very early period?—Error into which Salmasius has fallen relative to this matter?

7. It is commonly, but wrongly, supposed, that the title of "Œcumenical," given to the Patriarch of Constantinople, bears date only from the time of Pope Gregory I.?

8. Earliest use of the name "Cardinales Presbyteri?" and Bellarmin's false evidence respecting it?

9. How many inferior Orders of the Clergy in the Church of Rome? and what are their names?

10. Bishop Fell's argument, founded on the Greek origin of the name Acolythists, is not conclusive?

11. At what time, and owing to what circumstance, was the Order of Exorcists constituted?

12. Bede's explanation of the origin of the name White-Church, ("Candida Casa,") given to a place by the Britons?

13. Crosses when first set up in churches?

14. Places of Baptism how long without the church?

15. In what Library did Eusebius find a great part of the materials for the composition of his Ecclesiastical History?

16. In defence of Images in churches, Romanists have appealed to a Pseudo-Apostolic Council?

17. What circumstance makes it manifest, that Pictures of Saints and Martyrs were not at first brought into churches in order that they might be worshipped?

18. How are we to understand a passage in Eusebius's Life of Constantine, in which it is stated, that that Emperor had received Imposition of hands; it being certain that he had not at that time been baptized?

19. Meaning of the name "Competentes?"

20. The Ancients supposed that the want of Baptism, when that Sacrament had not been wilfully neglected, might be supplied in any one of four ways?

21. Who is the earliest writer by whom fragments of the Creed are preserved?

22. When did the Article of the Descent into Hell first find a place in the Roman Creed?

23. Give a simple proof that Transubstantiation was not one of the received doctrines of the Church kept secret from Catechumens.

24. What is to be understood by the name "Liber Sacramentorum," assigned to a work composed by Pope Gregory the Great?

25. To what book does Bingham especially refer on the subject of Divine Service having anciently been always performed in the Vulgar Tongue?

26. With respect to the inquiry, why none of the primitive Liturgies have come down to us in a perfect state, four circumstances are noted by Bingham?

27. The words *ὁση δόξαμικ*, in S. Justin Martyr's first Apology, how to be understood with reference to the question of Extempore Prayer?

28. What work by Lactantius is called by Bingham a "little golden tract?"

29. What seems to have been the commencement of the custom, that all provincial Bishops should use the Form of Prayer which was established in the churches of their Metropolitans?

30. How does S. Chrysostom explain those words of S. Paul, "Why are they then baptized for the Dead?"

31. What was the "Orarium" of Deacons? and what the difference between that word in its ecclesiastical sense, and when taken in its common acceptation?

32. The "Stationary Days" why so called?

33. Testimony of Eusebius as to the great devotion of S. James, Bishop of Jerusalem?

34. What appears to have been the origin of the custom of worshipping toward the East?

35. Two Vigils in every week anciently observed by the Church?

36. What was the "Missa Præsanctificationum?"

37. Date of the introduction of the Canonical Hours of Prayer? and what was their original?

38. What was the *Εὐχὴ διὰ σιωπῆς*, mentioned in a Canon of the Synod of Laodicea?

39. When Luther left Augsburg in 1518, after his Conference with Cardinal Cajetan, what was the nature of his Appeal to Pope Leo X.?

40. Name of the most remarkable satirical composition, written, at about the commencement of the German Reformation, against the champions of mediæval ignorance?—Give some account of the principal contributor to the work.

41. How does it clearly appear, that Melanchthon's views respecting the Freedom of the human Will gradually underwent a change, and became more at variance with those of Luther?

42. At what period did Lutheranism first prevail in Denmark? and how did King Christian II. promote the cause of the Reformation in that country?—Misprint in Hardwick relative to this matter?

43. Date of the Massacre of S. Bartholomew? and how many Protestants are supposed to have been then slain, both in Paris, and throughout France?

44. The title "Defender of the Faith" when conferred on King Henry VIII.? and at what time granted to any previous King? and to whom?

45. Name and date of Bishop Gardiner's celebrated treatise, in defence of the Ecclesiastical Supremacy of King Henry VIII.?

46. What does Hardwick call "the starting-point of the English Reformation?"

47. In what did the *Reformatio Legum* originate? and whence arises the present value of that work?

48. Names of some able men, whose petty scruples encouraged ecclesiastical agitations in Elizabeth's reign, and helped to excite the mightier tempests which afterwards arose?

49. When did the phrase "*Church of England and Ireland*" begin to be used? and for what purpose was it employed?

50. At what time was the Church of Malabar placed in subjection to the Roman Pontiff?

51. Whose name is properly associated with the opening of the regular Missions of the Jesuits in China? and what were his principles of action?

52. What fact is noted by Abp. Ussher with regard to the use of the Latin translation of the Bible in ancient times in Ireland?

53. Abp. Ussher frequently cites Sedulius and Claudius, whom he calls "two of our most famous Divines."—Who was this Sedulius? what the name of his work? and how was Ussher mistaken with respect to him?

54. Who was Claudius? when did he live? and what error is observable concerning him?

55. State some particulars relative to the ancient form of the Liturgy in Ireland.

56. When, and by whom, was the Roman Use brought in?

57. The Irish Church of the sixth century has been charged with Schism by Cardinal Baronius, (ad an. 566,) in relation to the controversy connected with the Three Chapters. Ussher, having quoted the passage from Baronius, makes some remarks upon it; and speaks of the Answer which Pope Gregory the Great is said to have sent to the Bishops of Ireland.—What are the facts about all this matter?

58. The defenders of Papal Supremacy have put forward three titles, in support of the Pope's claim to dominion over Ireland?

59. Upon what, according to Abp. Ussher, does the right of the Sovereign of England to supreme power in Ireland rest?

60. At the Council of Constance, in the year 1417, the Legates of the King of England gained precedence by means of an argument in which Ireland was concerned?

PROFESSOR OF DIVINITY.

HOOKE, ECC. POL. B. V.—LITURGY AND ARTICLES.

The following are some of the questions asked, vivâ voce:—

1. The religious errors of Eastern and Western Christendom have, speaking generally, differed in *kind* from each other?

2. How does Hooker account for the proneness of the Eastern Church to heresy?

3. What is his illustration of Superstitions arising out of harmless beginnings?

4. He rejects three of the Puritan axioms respecting Rites and Ceremonies?

5. He gives four Tests by which Church Ordinances ought to be judged?

6. In confirmation of the authority due to Antiquity, he cites a dictum of Aristotle?

7. To those who ask, Why we submit our judgment to the authority of the Church? Hooker replies in the words of Solomon?

8. With reference to the use of general principles in practical matters, he quotes an important axiom of Aristotle?

9. What is Hooker's illustration of the necessity of modifying general principles according to circumstances?

10. In one duty of Religion, Christianity is distinguished from all false religions?

11. Four kinds of Preaching? Where in the Liturgy are all four mentioned together?

12. How does Hooker answer the Puritan objection that our Liturgy resembles too much that of Rome, and too little those of the other Reformed Churches?

13. He specifies two particulars in which we prefer to follow the example of Rome, rather than that of the foreign Reformers, in regard to Public Prayer?

14. What instance of "a kind of heavenly fraud," on the part of the Church, does he notice?

15. What does Augustine term "*Oratio legitima*," and why?

16. The Church has retained Music in her public services for a two-fold purpose?

17. The form of the Gloria Patri which the Arians adopted is capable of a perfectly orthodox sense?

18. The *literal* adherence of the ancient Churches to their Liturgical forms is shown by a very striking instance mentioned by Hooker?

19. Hooker states three reasons why preservatives (such as Creeds, &c.) against heresies should be retained, even when the particular errors against which they were directed have become extinct?

20. What illustration does he give of the general principle that the same safeguard may serve several different purposes?

21. What is his illustration of the general principle, That a thing which has become unnecessary in itself should yet be retained by reason of its connexion with something else which might suffer damage by its removal?

22. The use of the Athanasian Creed, as a safeguard against heresy, he shows by a reference to the religious history of his own times?

23. With what capital doctrine of Christianity does Hooker connect the subject of the Sacraments?

24. Point out exactly this connexion as exhibited by him.

25. In what sense, according to Hooker, was the Incarnation *necessary* for the salvation of the world?

26. Besides the Atonement (made once for all), two purposes of *perpetual* importance are answered by the Incarnation?

27. Hooker lays down a "fundamental and most necessary principle in deciding all doubts and questions about the union of the two natures in Christ"?

28. When Scripture attributes to Christ's Divine nature what properly belongs to His human nature, and *v. v.*, what is the true solution of the difficulty thereby raised?

29. Hooker gives two remarkable Scriptural instances to illustrate this *avriḥosis*?

30. In what sense does Hooker allow the *Communicatio Idiomatum*?

31. Hooker observes that "four things concur to make complete the whole state of our Lord Jesus Christ"?

32. There were four corresponding heresies? And four Conciliar decisions?

33. Four words comprise whatever antiquity has treated of either in declaration of Christian belief, or in refutation of the foreshadowed heresies?

34. The analogy between the Sacraments and natural food fails in one important particular?

35. That the Sacraments do not confer grace *ex opere operato* may be expressed in the words of Solomon?

36. The three *essentials* of a Sacrament? According to Hooker, a fourth condition is always implied and presupposed?

37. How does Hooker answer the charge brought against him of contradicting Jewell on the subject of *Intention*?

38. What is Hooker's "most infallible rule in expositions of Sacred Scripture"? And to what case does he specially apply it?

39. How does Hooker apply to the Sacraments the words, "I will have mercy, and not sacrifice"?

40. Meaning of the maxim, "*Deum magis adverbis quam nominibus delectari*"? And to what case does Hooker specially apply it?

41. All parties,—Lutherans, Zwinglians, and Romanists,—agree in the main (according to Hooker) respecting the only point which is material in the Eucharist?

42. The question respecting the "*ubi Christus*" may be reduced within very narrow limits?

43. What, according to Hooker, is the grand *desideratum* in relation to the Eucharistic controversy?

44. What passage of Hooker has been charged with being opposed to the doctrine of the Church of England, respecting the Eucharist, in her Articles? And what is his answer?

45. The Lutheran doctrine of the Eucharist, as stated by Hooker, differs in two important respects from that which is laid down by their own symbolic writings?

46. Fundamental error in all Romish definitions of "The Church," according to Hooker?

47. What is his decision of the question whether "*extra Ecclesiam nulla sit salus*"?

48. He views the Church under two aspects which it is important to keep distinct?

49. With what view was he led to notice the mystical properties of numbers?

50. The English Reformers during the reign of Edward VI. were engaged in carrying out two distinct, though kindred, objects?

51. The means which they had of accomplishing these two portions of their work were extremely different?

52. What were the two chief points of controversy between the English Reformers themselves, during the early part of Edward's reign?

53. First Church enactment which received the sanction of the Convocation and the Parliament, in his reign?

54. The two principal alterations made in the Liturgy, at the revision in 1552, exemplify the progress of opinion in the direction of more complete reformation?

55. The change in the Vestment Rubric involved an important principle?

56. Attempts were subsequently made to restore both the First and Second Prayer Books of Edward, respectively?

57. The revision of the Liturgy in the reign of Elizabeth was not entrusted either to Convocation or to a Royal Commission;—why not?

58. In this revision the Queen's wishes were overruled, by the Committee appointed by her, in one very important particular?

59. She, on the other hand, exerted her prerogative, in direct opposition to the Committee, on two points which were then regarded as of high moment?

60. This was not the first occasion on which an important addition was made to the Prayer Book by Royal authority alone?

61. A still more decided exercise of the Queen's prerogative in matters of religion took place at a subsequent period?

62. A discretionary power was given to the clergy, and exercised for some time, of altering the Lessons appointed in the Calendar:—when was it given, and how long exercised?

63. When did the Puritans *first* make a demand for the total abolition of the Liturgy, and why?

64. What gave plausibility to the charge brought against Laud of corrupting the Book of Common Prayer?

65. The principal charge of this kind urged against him he refuted on a technical ground?

66. One of the prayers in our present Prayer Book was originally

composed by him? When and by whom was this prayer altered to its present form?

67. That the belief of Laud's having corrupted the Prayer Book was prevalent at the time of the Restoration appears clearly from one remarkable fact?

68. The Nonconformists at the Savoy Conference demanded an extension of the principle which they said guided the original framers of the Liturgy?

69. They desired that the reading of the Apocrypha in the Churches should be discontinued:—on what ground? And what was the Bishops' answer?

70. It has been said that the appointing of Apocryphal Lessons for Saints' Days was *intended* to denote their inferiority to Sunday:—This involves a great mistake?

71. In reference to what demand of the Nonconformists did the Bishops allege "the golden rule of the Council of Nicæa"?

72. In answer to another Nonconformist objection, the Bishops also refer to a Canon of that Council?

73. In support of which of their views did the Nonconformists appeal to the authority of "the most venerable Councils"?

74. The Bishops promised a concession in the Burial Service which the Convocation did not sanction?

75. In refusing to ratify this concession, the Convocation were palpably inconsistent with themselves?

76. The Bishops came to a unanimous resolution on a point which struck at the existence of one of the most cherished objects of the Nonconformists?

77. The characteristic doctrinal tendencies of the Non-juring Bishops had already shown themselves clearly at the Savoy Conference?

78. That their influence was not dominant in the Convocation of 1662 appears just as clearly?

79. Are Laymen permitted by our present Rubrics to take any part in the Public Service?

80. Down to the last Revision, a similar permission was given to Laymen in another part of Divine Service? And what led to its withdrawal?

81. In the Scotch Prayer Book (1637) a remarkable clause was added to the Rubric prefixed to the Decalogue?

82. The Title of the Communion Office in the original Prayer Book (1549) contained a twofold reference to the Services on which it was based?

83. The Confession in the Communion Office illustrates well one of the characteristic differences between our Church and the continental Reformers?

84. One phrase in this Confession is obviously taken from the Breviary?

85. This Confession and the Absolution which follows it are directed to be used on another occasion beside Communion ?

86. The framers of our Liturgy plainly intended the Holy Communion to be celebrated every Sunday ?

87. This intention was as plainly given up at the final Revision ?

88. In one of the Rubrics of the Communion Office provision is made for some future additions to the Church formularies ?

89. Our present Prayer Book, as well as those which preceded it, seems to contemplate the presence of non-communicants during the celebration of the Lord's Supper ?

90. Where in our Communion Office are the first words of the Canon of the Mass nearly reproduced ? And why *there* ?

91. It has been said that the Reviewers of 1662 ought, in consistency, to have omitted the words "militant here on earth" in the Prayer "for the whole state of Christ's Church :"—why ?

92. Show that this criticism is not just.

93. There is one expression in the clause added to this Prayer in 1662, which, were it not for the restraining phrase "militant here on earth," might *possibly* imply a prayer for the dead ?

94. The clause in question was taken nearly *verbatim* from an earlier Church of England document ?

95. The framers of the Canons again derived the clause from a still earlier source ?

96. The sense in which the petition for the dead in the original Prayer for the Church Militant (1549) was meant is plainly shown in another part of the Prayer Book ?

97. A passage in our present Communion Office is interpreted by some as countenancing the idea that the Eucharist is "offered for the living and the dead" ? What is your answer ?

98. The English Communion Office may appeal to very early authority in not having the Lord's Prayer in the Canon ?

99. If the Church's directions were strictly complied with, there would be no occasion for a second consecration of the Elements ?

100. The practice adopted by some persons of consuming what is left of the consecrated Elements on their knees, is not justified by the Rubric, and is plainly against the Church's intention ?

101. In the first Prayer Book (1549), what was specially called the "Post-Communion" ?

102. Two of the superstitious practices condemned by the Twenty-eighth Article are carefully guarded against in our Prayer Book ?

103. On what ground has it been argued that "elevation" is not contrary to the Prayer Book ? And how do you answer ?

104. The symbolical import attached in ancient times to the mixing of water with the eucharistic wine appears from the earliest recorded instance of the discontinuance of that practice ?

105. Origin of the practice of substituting a Collect for the Bidding Prayer?

106. Curious mistake respecting the use of the Bidding Prayer in a subsequent reign?

107. In what case is Baptism to be *hypothetically* administered?

108. It has been erroneously concluded from this Rubric that our Church does not consider a lawful Minister *necessary* for Baptism?

109. Our Church defines on two different occasions what she means by a "lawful Minister"?

110. An attempt was made in Convocation, subsequently to the last revision of the Prayer Book, to affirm the validity of Dissenters' baptism:—when? and how defeated?

THE IGNATIAN EPISTLES.

1. State the different opinions respecting the birth-place of Ignatius, held by Tillemont, Cave, and Pearson, respectively.

2. What is Hyde's suggestion as to the origin of his name?

3. How does Valesius interpret his cognomen Θεοφόρος? In what sense does Ignatius himself interpret the word?

4. An absurd legend attaches itself to Θεοφόρος?

5. By what suggestion does Baronius seek to reconcile the controversy raised by Origen's words respecting Ignatius' episcopate at Antioch?

6. What reason does Chrysostom assign for Ignatius' martyrdom at Rome rather than at Antioch? What is Greswell's conjecture; and on what internal evidence is it founded?

7. Chrysostom speaks in remarkable terms of Ignatius' intimacy with the Apostles?

8. In what order does Jerome enumerate the seven Epistles?

9. Ussher directly contradicts Eusebius and Jerome respecting one of the Epistles?

10. Jerome quotes a passage from Ignatius, which he says was taken "de Evangelio quod nuper a me translatum est;"—what Gospel does he refer to? Jerome misquotes?

11. Ussher and Pearson differ as to the year of Ignatius' martyrdom? Whence the difficulty in determining it?

12. What was the first use made (in the sixteenth century) of the Epistles attributed to Ignatius?

13. A passage cited by Theodoret from the Epistle to the Smyrnæans led to an important discovery?

14. Who first published the "Shorter Greek Recension"? One Epistle was wanting, and how supplied?

15. The "Ignatiano-mastiges" derive from a passage in the Epistle to the Magnesians what they deem an irrefragable proof of the spuriousness of that Epistle?

16. A passage in the recently discovered work of Hippolytus furnishes a complete answer to this objection?

17. In the Curetonian Syriac, how many, and which, of the Epistles are complete?

18. Jacobson accepts Hefele's account of the relation between this Syriac Version and the shorter Greek recension?

19. Cureton's argument against the supposition of an epitomizing monk is based on an utter mistake as to the principles of monasticism?

20. One of the Epistles furnishes a decisive answer to the assertion that the shorter Greek recension was either forged or interpolated with a view to hierarchical objects?

21. Which of all the Epistles is most frequently quoted by the ancient Fathers?

22. Of which is the genuineness most disputed? The passage most strongly insisted on as a proof of its spuriousness, admits an easy explanation?

23. That "the disciples were called Christians first in Antioch" is indirectly confirmed by Ignatius?

24. Ignatius applies to the Smyræans the same description that St. Paul does to the Corinthians? Important inference from this?

25. The expression *ἡ καθολικὴ ἐκκλησία* occurs for the first time in Ignatius? Quote the passage, and explain it.

1. *ἐμὲ γὰρ ἵδρι ὑμῶν ὑπαλειφθῆναι πίστει, κ.τ.λ.* ad Ephes. c. 3.
Pearson illustrates the word *ὑπαλ.* from Plutarch? The Vet. Int. follows another reading?

2. *καὶ γὰρ Ἰησοῦς Χριστός, τὸ ἀδιάκριτον ὑμῶν ζῆν, τοῦ Πατρὸς ἡ γνώμη, ὡς καὶ οἱ ἐπίσκοποι οἱ κατὰ τὰ πέρατα ὀρισθέντες ἐν Ἰησοῦ Χριστοῦ γνώμῃ εἰσιν.* ib.

Translate, and explain this passage.

3. *ἐὰν μὴ τις ᾖ ἐν τὸς τοῦ θυσιαστηρίου, ὑστερεῖται τοῦ ἄρτου τοῦ Θεοῦ.* ad Eph. c. 5.

(a). What false inference has been drawn from this passage?

(b). Ignatius' use of the word here is found also in Clem. Alex. and Chrysostom?

4. *εἰς οὖν διδάσκαλος, ὃς εἶπεν, καὶ ἐγένετο· καὶ ἂ σιγῶν δὲ πεποίηκεν, ἄξια τοῦ Πατρὸς ἐστίν.* ad Eph. c. 15.

There are two interpretations of the words *ἂ σιγῶν*? Cotelierius supports his by reference to another remarkable passage in this Epistle?

5. *περίφημα τὸ ἐμὸν πνεῦμα τοῦ σταυροῦ...* ad Eph. c. 18.

Translate. What is Bunsen's emendation?

6. How does Ussher interpret the words *τρία μυστήρια κραυγῆς* (c. 19)?

7. *ἀντίψυχον ὑμῶν ἐγώ, καὶ ὃν ἐπέψατε εἰς Θεοῦ τιμὴν εἰς Σμύρναν...* ad Eph. c. 21.

Translate, and point out the construction.

8. Jacobson adopts Cotelierius' interpretation of οὐκ ἀπὸ σιγῆς προελθών... (ad Magn. c. 8):—What is it?

9. οἱ καιροὶ παρεμπλέκουσιν Ἰησοῦν Χριστὸν κατ' ἀξίαν πιστευόμενοι... ad Trall. c. 6.

What emendations of this passage have been proposed?

10. ἥτις καὶ προκάθηται ἐν τόπῳ χωρίου Ῥωμαίων ad Rom. Salut.

Translate. What false inference has been drawn from this passage respecting the early organization of the Roman Church?

11. οὐ σιωπῆς μόνον τὸ ἔργον, ἀλλὰ μεγίθους ἐστὶν ὁ Χριστιανισμός... ad Rom. c. 3.

Translate. What emendation has been proposed from Vet. Int.; and what is the meaning of the passage so emended?

12. διδεδεμένος δέκα λεοπάρδοις, ὃ ἐστὶ στρατιωτῶν τάγμα ad Rom. c. 5.

Bochart and Dallæus conclude against the genuineness of this passage, but on different grounds?

13. ὁ δὲ τοκετός μοι ἐπικείται. Σύγγνωτέ μοι, ἀδελφοί· μὴ ἐμποδίσητέ μοι ζῆσαι, μὴ θελήσητέ μοι ἀποθανεῖν, τὸν τοῦ Θεοῦ θέλοντα εἶναι· κόσμῳ μὴ χαρήσησθε... ad Rom. c. 6.

Translate. What scriptural allusion in τοκετός? Illustrate this use of ζῆν and ἀποθανεῖν. How did Vet. Int. read the last words?

14. ἀλλ' ἡ προσευχὴ ὑμῶν εἰς Θεόν με ἀπαρτίσει, ἵνα ἐν ᾧ κλήρῳ ἡλεήθην, ἐπιτύχω· προσφυγῶν τῷ εὐαγγελίῳ ὡς σαρκὶ Ἰησοῦ, καὶ τοῖς ἀποστόλοις ὡς πρεσβυτερίῳ ἐκκλησίας. ad Philad. c. 5.

Translate. What important inference relative to the Canon has been deduced from this passage?

15. ἐπεὶ ἤκουσά τινων λεγόντων, ὅτι εἰάν μὴ ἐν τοῖς ἀρχαίοις εὕρω, ἐν τῷ εὐαγγελίῳ οὐ πιστεύω· καὶ λέγοντός μου αὐτοῖς, ὅτι γέγραπται, ἀπεκρίθησάν μοι, ὅτι πρόκειται. ἐμοὶ δὲ ἀρχαῖά ἐστιν Ἰησοῦς Χριστός, κ. τ. λ. ad Philad. c. 8.

Translate this passage accurately, with short notes. This passage is celebrated in New Test. criticism?

16. ἐγὼ γὰρ καὶ μετὰ τὴν ἀνάστασιν ἐν σαρκὶ αὐτὸν οἶδα καὶ πιστεύω ὄντα. ad Smyrn. c. 3.

Jerome erred in the translation of this passage, and misled the Vet. Int.?

17. τὰ δεπόσιτα ὑμῶν τὰ ἔργα ὑμῶν, ἵνα τὰ ἀκκεπτα ὑμῶν ἀξια κομίσησθε. ad Polyc. c. 6.

Translate. Show that the inference drawn from this passage against its genuineness is not just.



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